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~~In Two Parts—Part 1~~

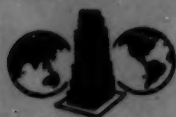
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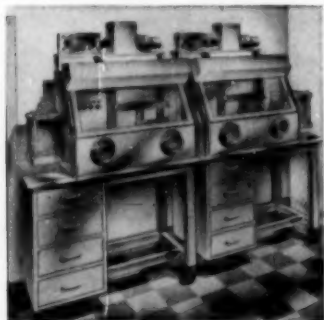
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Academy of Psychosomatic Medicine—Oct. 8-9; Plaza Hotel; New York City.

Alaska Territorial Medical Association—August 15-17; Mt. McKinley Park Hotel, Mt. McKinley Park, Alaska.

American College of Hospital Administrators—September 11-13; Civic Opera House, Chicago.

American Hospital Association—September 20-23; Palmer House; Chicago.

Conference of International Union Against Tuberculosis—September 26-October 2; Madrid, Spain.

Congress of International Association for the Prevention of Blindness—September 12-17; Geneva, Switzerland.

Congress of International Society of Medical Hydrology—September 26; Vichy and Paris, France.

Congress of International Society of Urologists—April, 1955; Athens, Greece.

Inter-American Congress of Radiology—April 24-29, 1955; Shoreham Hotel, Washington, D. C.

Inter-American Session, American College of Surgeons—January 11-14, 1955; Lima, Peru.

International Anesthesia Research Society—Oct. 10-14; Los Angeles.

International Congress of Clinical Pathology—September 6-10; Washington, D. C.

International Congress on Diseases of the Chest—October 4-8; Barcelona, Spain.

International Congress of Hematology—Sept. 6-11; Paris.

International Congress of Industrial Medicine—September 13-19; Naples, Italy.

International Congress of Internal Medicine—September 15-18; Stockholm, Sweden.

International Congress on Mental Health—August 14-21; Toronto, Ont., Canada.

International Congress of Ophthalmology—September 10-11; Montreal, Canada.

International Poliomyelitis Congress—September 6-10; Rome, Italy.

Pan American Congress of Pediatrics—August 1-7; Sao Paulo, Brazil.

World Congress of Cardiology—September 12-17; Washington, D. C., and Bethesda, Md.

World Medical Association—September 26-October 2; Rome.

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Teaching Social Aspects of Medicine in the Medical School

JOHN B. YOUMANS and MARIAN E. RUSSELL

ALTHOUGH THE SOCIAL ASPECTS of medicine have been taught for many years, it is only recently that applied sociology has been formally introduced as a distinct discipline in the educational program of medical schools.

The recent phenomenal advances in the science of medicine have brought about deficiencies in the knowledge of the meaning and importance of social and emotional factors in medicine. In the science of medicine we have pushed forward, ever seeking things to measure function, performance, resistance and capacity. We are ever becoming more quantitative, but there are some things we cannot measure and there are some things we do not know and, hence, cannot measure. We who teach and train doctors must not forget that most of our students will practice medicine, will care for the life and health and happiness of people. Understanding and love of people must complement scientific learning.

Therefore, we must see to it that our students and our graduates have a knowledge and appreciation of the importance of the social and emo-

tional forces which affect their patients, and a skill in the application of this knowledge in their practice. The lessening incidence and the increasingly frequent dramatic cures of severe, clearly defined somatic disease have exposed a large underlay of disease not susceptible to such cure. This has led to sense of frustration because these miraculous cures do not heal all men's ills. There is an awareness of the general dissatisfaction on the part of the public with the type of medical care received, despite high regard for the triumphs of science.

It is clear that the student must learn the nature of social aspects of medicine and the principles of applying this knowledge. It is also clear that he must *himself* put it to use in his practice. It is equally clear that in modern society and with current and future types of medical practice, he will not be able to use it alone and unassisted but must, as in other instances such as nursing, call on auxiliary services to fill the gap. This service is furnished by applied sociology in the form of medical social service.

If this is to be done, qualified medical social workers should be used to assist in teaching for two reasons: (1) because of their specialized knowledge and training in the social aspect of medicine, and (2) because

Dr. Youmans is dean and professor of medicine, and Miss Russell is professor of medical social service at Vanderbilt University School of Medicine. This article is adapted from a paper presented at the 15th anniversary of the organization of the social service department at Duke University, November 1952.

Teaching Social Aspects of Medicine

if the student is to use social service in his practice, he must learn something of what social service is and does. It is probably unnecessary to point out that this does not mean teaching him to be a social worker.

There remains then the need to determine just how this subject is to be taught in medical schools. Until recently, what has been accomplished has been done in a haphazard fashion. Individual instructors have included it in their discussions on ward rounds, in clinics and their lectures. It has been discussed in connection with preventive medicine, particularly in relation to consideration of public facilities and agencies available for medical care and social assistance. Perhaps some of the most effective teaching has been the result of conferences and consultation between students and medical social workers concerning the student's patient (as ward or outpatient clinical clerk). Finally, in some medical schools an experience with domiciliary medical care has been given students which perforce has introduced something of the social, economic and emotional aspects of medical care and practice.

Such a method of teaching, however, is uneven and incomplete. It lacks continuity and a sufficiently long period of contact with people and situations. Finally, it is for the most part conducted during the clinical years of the student's course, at a time when his interests and activities have been centered on and dominated by disease and the science of medicine, leading to a lack of appreciation and interest in social aspects of disease, to say nothing of the social factors affecting well people and their relation to prevention of disease.

A newer and better approach is a

method devised and introduced at the University of Pennsylvania School of Medicine. The essence of the plan provides for the assignment of a certain proportion of each first-year class electing this course to families which the student follows throughout his four years, acting as a family health advisor.

The Vanderbilt Program

At Vanderbilt, a somewhat similar course was introduced in the fall of 1951 and we have now had three years' experience with it. It is an interdepartmental course, running through the four years and required of all students. For want of a better name it is called social and environmental medicine. The greater part of the teaching in the first year is done by the departments of psychiatry and preventive medicine and the social service division. There are also consultants from other departments. The participation by various other departments varies over the four years but social service remains a continuing contact.

In the course as a whole an attitude toward medicine is stressed which recognizes the human aspects of illness and the patient as a person, as a member of a family unit and of society. Emphasis is placed on developing an attitude toward patients which includes an understanding of the importance of personality factors and of the emotional, social and environmental forces which affect health and are often significant in the prevention, diagnosis and treatment of diseases and disablement.

For the first-year class the particular objectives are:

1. To impart knowledge and appreciation of the fundamental principles concerning the human organism as a structural, functional and

social unit, the nature of normal growth and development (physical, mental, emotional and social) and the basic concepts of human personality and adaption of behavior.

2. To instruct the student in the principles and techniques of interviewing.

3. To give the student an early understanding of the principles and meaning of the doctor-patient relationship and the significance of this interpersonal relationship in the work of diagnosis and treatment.

To this end, therefore, the course for the first year is organized as follows: there is a weekly lecture of an hour with the full class and seminar discussions of one hour once a month. (The class of 52 students is divided into four groups with one group meeting each week with the professor of psychiatry and the professor of medical social work.) Each student is assigned a family with which he maintains contact throughout his four years, thus permitting direct and continuing observation of the family in its own environment.

Since the emphasis of the course is on personality and social forces in the family and on normal growth and development, families are chosen in which problems of disease are at a minimum. Such families are found among those of women attending the prenatal and well-baby clinics of the outpatient department of University Hospital. No effort is made to select families with known social problems. Criteria for selection include accessibility, the prospect of continuing care and families in which there are young children or mothers of child-bearing age. An effort is made to select families with different social, cultural and economic backgrounds. In the prenatal clinic, additional criteria include a minimum of physical and

emotional symptoms, patients to be in their first or second trimester of pregnancy and to have made two or three clinic visits prior to the assignment.

Selection is made jointly by medical and medical social service members of the faculty in each of the clinics. Introduction of the mother or expectant mother to the student is accomplished in the clinic at the time of her regular appointment. The medical faculty member assigned this specific responsibility in the respective clinics discusses the program with the individual patient or mother, ascertains her willingness to participate and introduces the student to her. It is explained that students are in the beginning phase of their medical education and unable to give medical advice. The program is presented as an extension of hospital service in that the student serves as a channel of communication between the family and the hospital and is able to provide the physician attending the patient in the clinic with additional facts about the patient's home environment.

At the time of his introduction to the patient the student makes an appointment for a home visit. Prior to and following the home visit he consults with his medical advisor or his social service advisor. A written report of the home visit is submitted by the student.

The medical advisors are selected from among the faculty on respective services and it is intended that they confer with the students concerning disease and medical problems which might arise in the families in order to give the student some understanding of the effect on the family and assist him in his relationship to it. In addition, the student consults with other departments such as anatomy

Teaching Social Aspects of Medicine

and biochemistry in regard to growth and development. Both medical and social service consultants are used to advise on social, emotional and environmental factors noted, to offer guidance in dealing with social problems and questions of students about their professional relationships with families, to give individual instruction in interviewing as needed and to help students in the use of community health and welfare services when indicated.

In making their first home visits students are urged to concentrate on establishing a positive relationship with the family as an initial step. It is emphasized that they are not expected nor is it desirable for them to attempt at this point to secure complete factual information or background history. Stress is placed on allowing the patient to talk and on the importance of listening and observation by the student. This kind of an approach is considered advisable since the initial objective is to develop beginning skills in the establishment of a relationship by the student which could be maintained on a continuing basis and because the focus is on helping the student to develop an awareness of feelings and factors and to learn how to work with people, rather than to concentrate on precise history taking.

For the second, third and fourth years the plan is briefly as follows: the students continue with their families, making visits at approximately the same intervals and reporting to their advisors. When necessary, by reason of the loss of a family for one reason or another, new families are to be supplied if practical.

In the second year a combined lecture and field trip course in preventive medicine, built around two diseases—rheumatic fever and tuber-

culosis—is given. This occupies the first two quarters. Work with the families constitutes the only work in the third quarter of the second year.

In the third year there is an accentuation and strengthening of the preventive and socio-environmental aspects of medicine as related to the patients assigned to the clinical clerks. This is done in part by representatives of the department of preventive medicine doing actual clinical work with the clerks. Social service continues but strengthens its previous contribution, which is work with individual patients. Work with the families, of course, continues.

In the fourth year the work of preventive medicine by the staff of the department, through individual patients assigned to the clerks, is continued. A program of home care participated in by the students and staff of preventive medicine is being planned. In this, social service plays the usual role in an augmented fashion. The student maintains his contact with the family.

First Families Reactions

One of the questions raised about this educational project has been "how do families accept it?" We believe that preparation by a medical instructor of the family for participation in the program is highly important, as is the introduction by the medical instructor of the student to the family.

It was our experience that almost all patients reacted favorably to the program. Some mothers and expectant mothers specifically told their students that they appreciated the personal contact and the opportunity to discuss in a less hurried fashion some of the things about which they had questions, saying that the doctors in the clinics were often so busy and hur-

ried that they hesitated to take up their time with their troubles or questions. Patients also expressed their interest in a closer relationship with the hospital, and stated it was helpful to be able to call one person at the hospital who knew them and could find out what they wanted to know (families were advised to contact the student by telephone through the medical school). This did not prove to be a burden or interruption to students in their work, but did prove to be of assistance to patients in a number of instances and to increase the student's interest.

Some patients were sufficiently impressed with the explanation of the program to ask if there would be an extra fee for the service, a question which had not been anticipated and which startled one or two students. It was learned that some families informed their neighbors with pride of the new service Vanderbilt Hospital was offering. We saw no evidence of families becoming overly dependent or of students becoming personally involved with them as a result of this program, in answer to another question about such teaching.

In only two or three instances did patients refuse to participate in the program when it was presented to them. These were prenatal patients who were quite young, whose husbands were out of town at times in their work and who were worried about what their neighbors (or their husbands) would think about a young man calling on them at home. One such patient later said she was sorry she had raised a question about it and was willing to participate. In view of her possible feelings she was reassured and told that she did not have to do this and no student was assigned. There were, as is probably inevitable in such a program, some

patients who proved to be less responsive and interested.

Effect on Students

The record so far indicates a growing realization among these students of the various facets of health and normal development and of the effect of forces such as economic and emotional stresses, illness and cultural factors on individuals and families. We hope they have a concept of health which is not defined as the absence of disease. They have developed beginning skills in dealing with people on a professional basis. Evidence indicates that they have learned to listen to patients and to observe, and that they have acquired some capacity for evaluating facts. They have begun to observe their own attitudes and to control their feelings in their dealings with patients. They have accepted responsibilities placed upon them and have carried them in a responsible manner.

One of the opportunities afforded students has been that of participating actively in actual health care. They have prompted patients to return for post-partum care; they have influenced parents to bring children in for proper immunization; they have inquired about defects discovered in school health examinations and have influenced parents to bring the children to the hospital regarding possible correction of defects. They have urged continued medical supervision in the clinic for recommended therapy for adult members and children. They have learned something of the availability of health and welfare resources in the community and how to use them.

Another question raised about this kind of course has been whether the introduction of students to fam-

ilies in the first year creates great anxiety among them to the point of affecting their studies adversely. Our experience does not bear this out. If it were so, one might ponder whether it would be any less traumatic to students to have such occur at the beginning of their clinical work in the third year. At the beginning of their work with families almost all the students showed some uncertainty about how to establish a relationship, what to talk about with patients, what to do if patients did not respond. It seems natural to expect that many students at the beginning will be unclear and troubled about how to relate in a professional way to people. Such an experience for the student, unequipped with knowledge or skills, is new and may well be threatening. If families did not present specific health or social problems, some students questioned what they had to offer and why they should continue to see their families. They were frustrated by the intangible. Others feared they might be imposing or would be resented by the families. If families presented definite problems, some students tended to be concerned over their lack of specific knowledge and their inability to give the help needed. On the other hand, many students accepted easily the role of a person who can serve as a channel of information between the family and the hospital, who will learn much about growth and development and interpersonal relations and will be able later to give more specific help to families. These students used consultation from faculty advisors well and made constructive use of suggestions or ideas.

There were, as expected, some students who were quite tense and overly anxious about their work with

families. Such students included those who were fearful of being inadequate, who were setting high standards for themselves, who worried about their performance and their grades and who were generally uneasy in their relations with people. They tended to exaggerate their feelings of inadequacy. Fearful of being rejected by their families, they did not recognize signs of acceptance or the feelings and fears of families. These students needed considerable reassurance and ample opportunity to discuss their experiences with their families. They did not show signs of being overwhelmed or depressed, however. Capable of using consultation, they showed definite progress in their work and increasing ability to recognize and deal with their own attitudes and feelings, the area in which they experienced difficulty. They developed greater skill in understanding the reactions of patients and in dealing with them.

That all students have their own problems we have known. The freshmen are no exception. We know also that the student's preprofessional personality, his previous experiences, his sense of values and his interests are part of what he brings to his learning experience. We know that motivations for entering medical training vary among students and that students attach different values to this education, depending upon what they hope to gain and how hard they have had to work to enter medical school.

The very nature of the content of this particular course is such that students are brought face to face with these factors. They have to face their own behavior, their attitudes toward people and social conditions, their own sense of values, their very reasons for wishing to enter medical

practice. This is not always easy for students to do.

It is inevitable, in a course of this type, that the student must think about his own reactions, that he must learn to deal with his own feelings as well as those of his patients. It is not surprising, therefore, that in talking with their advisors about how to deal with patients and to manage a professional relationship, various students discussed some of their personal experiences, their earlier background, their particular interests and their feelings toward people. There was never any effort made by the social service advisors of the faculty to elicit personal information from the students, this being considered inappropriate and irrelevant to the teaching role. As students brought up personal matters which were pertinent to their understanding in the course and the development of insight in their work with families, the discussions were handled by the advisors as they pertained to the teaching situation.

It happened also that some students wanted to talk about some of their current troubles and worries such as financial problems, concern over grades, fear of failure and how hard they were finding the first year. Sometimes listening to the students sufficed. Other times students were referred to the appropriate medical faculty or to the dean's office for advice or help.

We do not believe this experience indicates that this particular course precipitates emotional problems among students. It does necessitate their thinking about feelings, which is often painful, but in this case is germane to the learning experience. As regards students discussing their immediate personal problems, in some instances this was probably the

result of their feeling safe with non-medical members of the faculty who, by virtue of their own professional training, showed awareness and understanding of the students' problems. We do not think that this use of advisors is undesirable provided some controls are maintained, although it had not been anticipated.

We have been questioned about the advisability of introducing students to actual patients in their first year and of giving them too great a responsibility before they can assume it or recognize their limitations. If it can be assumed that students enter medical training partly because of their interest in people, it is reasonable to assume that an early introduction to patients and their families has the advantage of stimulating the students' enthusiasm for learning about people and for capitalizing on their motivation and eagerness. Students were not asked to assume more responsibility than it was believed they could carry with adequate faculty consultation, and this was available at all times. It was believed also that they learn best by experience in this phase of teaching. The students recognized the limits of their competence and responsibility and sought consultation and direction from advisors and clinicians, as appropriate.

Another question raised by some educators has been whether students should be sent to homes alone. Should they not accompany another physician or social worker or public health nurse? We believe that student participation and assumption of direct responsibilities, insofar as possible, are highly valuable in learning. If the student visits alone, he carries direct responsibility for what he does, which is considered an important feature in our program. Furthermore,

because he goes as a doctor in training, it would be inconsistent with the purpose of the program to have him accompanied by a member of a nonmedical profession.

Based on the concept that the practice of medicine is based upon a relationship between two people, the patient and the physician, we have placed emphasis on teaching what is involved in such an interpersonal relationship. The initiation of actual contact with patients in the first year and the opportunity to continue relationships with the same families throughout the four years should provide for the student a means of developing his skills gradually in this area and of maturing throughout this learning experience. This should help the student to overcome the insecurity felt by many students in their contacts with patients in the first clinical year. Throughout the first-year course, the impact of the patient's personality on the student became apparent. It was observed also in the class and seminar discussions that students developed their own ideas and new ways of thinking. As they used new ideas, they took on more meaning and it was possible to see changing attitudes and philosophy among the student group as time passed.

In their direct contacts with families, students raised many questions such as: what can be done about personal questions asked by patients? How can the unexplained visitor be dealt with? How can a conversation be kept on a professional level? What is the difference between a professional relationship and one based on personal friendship? Will patients accept you if you are not their personal friend? What do you do when a patient refuses to give

information or when you know the patient has not given true facts? How can you accept a patient when you disapprove of his behavior? What can a patient's silence mean? How can a student know if he is accepted or rejected by the patient?

The desirable features of the course at Vanderbilt are, we believe, the following: it is not haphazard and, while teaching in connection with patients in the clinical years remains largely an individual, patient-doctor-student matter, there is a planned course of instruction with definite, assigned responsibility for supervision and direction as well as formal exercises. It starts when the student begins the study of medicine, while he is still in large measure receptive to the notion of seeing people in patients and before he becomes case hardened and somewhat impervious to the human side as a result of stimulated and enforced interest in pathology; before he has absorbed the blase attitude toward the "crock," the "chronic," the "neurotic." Indeed, it does more than that. It provides a positive response to his need to see something of medical practice along with his pursuit of science, to strengthen motivation, to answer the problem of how to maintain interest while pursuing the abstract. In this regard we believe it is much better than freshman clinics or lectures or orientation courses.

Finally, and very importantly, it reveals the student's aptitude for the study and particularly the practice of medicine; his strong points and his failings as a person dealing with people in the role of a physician at a time when defects can be corrected and if necessary the desirability of giving up the study of medicine can be pointed out.

Educational Science in Medical Teaching

RUSSELL MEYERS

IN BROAD TERMS, the influence of educational science on medical teaching in the United States may be summarized by quoting briefly from pertinent articles of relatively recent date:

"We have advanced rapidly in all phases of medicine but slowly in medical teaching. It is time to improve our medical teaching by applying scientifically proved education principles based on careful research."⁴³

"... for while the medical sciences have been rich and inviting fields for experimentation and research, medical education is still virgin terrain, waiting for equally meticulous inquiry into the art of effective teaching of its materials."²⁷

"... in the professional schools, the teaching staffs and the curriculum committees ... consist in large part of technically qualified experts whose interest in and familiarity with the science of education as such is lamentably small."³³

That this state of affairs prevails in the year 1953 may come as something of a surprise to the student of general education, particularly if he supposes *a priori* that the chief function of a teacher in a college of medicine must be that of teaching and that medical

teachers must surely have acquired the general background of pedagogic theory and communication skills available in the warehouse of educational science. Such supposition is, unfortunately, not rooted in fact. To be sure, exceptional individuals can be found who feel it incumbent to acquaint themselves with the field of general education as well as with their special areas of interest in the basic medical and clinical sciences. They are, however, almost unbelievably small in number.

The Medical Teacher

Confronted for the first time with these disconcerting circumstances, the student of general education may feel constrained to ask, "What can be responsible for this state of affairs?" As might be supposed, no simple explanation is at hand. A satisfying account is more likely to be found cast in multi-causal than in unit factor terms.

For one thing, medical teachers are not invariably interested in teaching, much less in teaching as an art-science. With such individuals, as with many teachers in other disciplines at the undergraduate and postgraduate levels, the attainment of an academic appointment is a means to an end which does not include teaching as such. Their concern in seeking an academic post includes such ends as opportunities for re-

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search; accessibility to a quantity and variety of clinical materials, records and physical facilities not ordinarily available in nonteaching institutions; the opportunity to make frequent professional and social contacts of a stimulating character; the enhancement of self-esteem, authority and prestige, economic security or, in the case of some part-time teachers, a command of higher professional fees; the circumvention of certain unpleasant aspects of private practice; and similar determinants of action. For such individuals, teaching constitutes an unwelcome but necessary chore—the chaff they must handle in order to obtain the desired wheat. Accordingly, it receives a minimum of attention, time, planning and effort at continuous personal improvement.

Secondly, the historical development of medical teaching in this country, characterized until the late 19th century by the preceptor, proprietary school and repetitional systems of instruction (as opposed to the university and graded curricula of Europe), has been such as to becloud rather than clear the differences between knowing a subject and knowing the devices by which it can most effectively and economically be communicated to medical students. And although present-day medical teachers often give lip service to the distinction, many of them (including those who genuinely like teaching) behave in their daily activities as if it is only necessary to be well informed in their chosen technologic areas to qualify as competent teachers. The communication process, so inherent in all teaching, is somehow left to take care of itself. A few individuals actually exhibit a modest pride in the ineptitude of their teaching efforts, covertly implying that by this token they rate a peg or two

higher as investigators, clinicians, etc.

Thirdly, up to the present no insistence upon a sound preparation in educational science has been made a prerequisite to medical teaching by those responsible for the hiring of faculty staffs. Equally significant is the fact that no ready provisions are at hand, in or out of the medical colleges, for such preparation. The standard premedical curriculum of the Association of American Medical Colleges and the Council on Medical Education and Hospitals of the American Medical Association does not require a course in general psychology, although it clearly specifies physics, chemistry, biology, sociology, English and foreign language. Moreover, the catalogues circulated by the medical colleges themselves do not include courses in the science of education among those "recommended." It may be added that neither general nor educational psychology is available in the medical schools. As a consequence, a very considerable number of medical graduates from whom faculty members are eventually recruited have never had so much as an introduction to general or educational psychology. Very few of them feel the impulse to pursue such courses "on their own." It is therefore not surprising that the potentials of these disciplines for improving medical education go largely unperceived, much as those of physics, chemistry and biology went unperceived before they became integral parts of premedical and medical education.

Fourthly, no very high premium is placed upon teaching skill as such in determining initial appointments to the faculties of our medical colleges, advances in remuneration, and subsequent promotions. By far the highest premium is placed upon research

performance in the basic and clinical sciences and upon the teacher's reputation among his peers for originality, consistency and dependability as exhibited in his contributions. In placing the emphasis here, the school makes a "quick deal" to its own advantage, sharing the halo effect radiated by its reputable staff members. It hopes thereby to attract more and better students and, in the long run, more and better applicants for staff positions. Second only to research in determining the worth of the candidate for appointment or promotion come clinical diagnostic acumen and therapeutic skill. It is a melancholy and all too frequent circumstance that when a faculty member is "up" for promotion to an academic rank; e.g., full professorship or chairmanship, with which his extradepartmental fellows are concerned, the council reviewing his *curriculum vitae* is inclined to give more weight to the number of papers to which his name is attached than to their quality. This is an easy sort of error to fall into, for the simple reason that it is one of omission and default rather than of commission.

Few of those on the council are actually capable of critically examining their colleague's writings; and those who are often prefer to take someone else's word. It is, after all, a time consuming, troublesome and not infrequently thankless task to embark upon a rigorous evaluation of a colleague's scientific writings. The task is even harder in respect to his teaching ability. If teaching ability is mentioned at all, it is cursorily described in adjectival terms, "excellent," "good," "fair," etc., and left at that. No serious attempt is made to establish clear criteria by which teaching ability may be evaluated, least of all to implement measures by which a

particular teacher's classroom, laboratory, or bedside performances may be examined in terms of those criteria. "Teaching," say Lippard and others,²⁰ "should be regarded as a major endeavor, not an adjunct to research." In the medical colleges we have scarcely begun to act in accord with this wise exhortation.

Fifthly, the voice of medical education as a formal discipline, expressed in terms of publications, is but feebly uttered by its advocates and, for the most part, poorly heeded by those who should be most concerned. The same may be said for its local and national society meetings.

The best estimates indicate that there are about 178,000 physicians practicing in the United States. Of the 15,563 engaged in teaching in medical schools in 1951, some 14,000 were physicians.¹² The remainder consisted of those with degrees other than the M.D. Hence, the ratio of physicians manifestly concerned with education in the 79 medical schools operating in this country to those not so concerned is approximately 8/100. These figures do not, however, fully reflect the working circumstances, for with few exceptions every doctor must play an active role, however informal, as a teacher. He is likely at one time or another to be concerned with the instruction of interns, residents and fellow practitioners at hospital rounds, journal clubs and departmental meetings, at local medical societies and mortality-morbidity conferences, and in military service. His services are likely to be recruited for the instruction of nurses, ward aides, physical therapists, laboratory and radiologic technicians and similar paramedical personnel, and he is in any case destined to play a role as teacher among his patients and their families. It will be recalled at this point that the term

"doctor" (*doceo*, L.) originally meant teacher.

In view of all this it is noteworthy that, excluding periodicals dealing primarily with physics, chemistry and psychology, over 800 journals are subscribed to by most modern medical libraries of which one only addresses itself to problems in medical education. This circumstance can be pointed up by noting that in the area of internal medicine alone there are upwards of 142 periodicals; in experimental medicine, 27; in surgery and the surgical specialties, 62, and in neurology and psychiatry, 48. By far the majority of these are published monthly and not a few appear weekly. The only journal devoted to medical education, the *Journal of MEDICAL EDUCATION* (1951), originally published as the *Bulletin of the Association of American Medical Colleges* (1930) and later as the *Journal of the Association of American Medical Colleges*, appeared bimonthly through the years until 1953, when it became a monthly. This is eloquent evidence of the relative interest in educational science and communication skills exhibited by current-day physicians. And this is but part of the story. In an informal pilot survey carried out in 1949 among 85 teachers distributed in four medical schools, 13 (15 per cent) did not know of the existence of this journal; 52 (60 per cent) acknowledged they had never read an article published in it, and 13 (15 per cent) declared they read it "only occasionally." Only six educators asserted that they read the periodical regularly and systematically. This merely suggests the state of affairs that prevails among educators. Until a thoroughgoing survey is carried out among physicians at large, the circumstance must remain a matter of conjecture.

The situation is the more regrettable because of the current shortage of medical teachers. The medical colleges are under heavy pressure to educate more physicians. This of course necessitates the recruiting of more instructors. High standards in the selection of instructors cannot be rigorously insisted upon and the machinery for rectifying matters is at present so meager that the outlook for the year 1970 as anticipated by far-seeing medical educators and administrators^{12, 21, 29, 39} can only be described as grave.

Finally, there are those who openly express skepticism that principles and techniques arising from research in general education and learning psychology have very much to offer medical education. "Medical faculties," say Darley and Turner,¹¹ "are rightfully distrustful of principles arrived at by teaching young children or rats and other laboratory animals." These promise to be welcome words to those who seek rationalization for their current unfamiliarity with educational science and methodology.

Here, then, are six identifiable reasons in explanation of the circumstance that medical education has felt so negligible an impact from educational science. The list is in no sense as complete as it might be made.

Errors in Methods

The conventional view is that the term "medical education" refers to those operational events focussed upon and experienced by the student during the four years that lead up to the M.D. degree. Some writers go somewhat beyond this to include also the premedical years and/or the internship. Whatever concept is embraced, it is important to realize that medical education is not a process that occurs in *vacuo*; rather, it takes

place in a complex cultural setting in which the historical past inevitably plays a time-binding role, affecting both students and staff members and influencing the philosophic goals of the curriculum, its content and scope and the methods of their implementation.

In a very real sense the education of a physician begins early in the pre-school period and continues through all the years of his practice. Beyond the internship his education may or may not include a residency, fellowship and courses of postgraduate study, but it is in any case certain to include the widening of experience and the maturing of judgment engendered by daily practice, the reading of medical literature, contacts and consultations with fellow practitioners, and attendance at hospital rounds, staff and society meetings.

This is at once a comprehensive and deterministic concept of medical education and its adoption carries important implications. Among other things, it points up the fact that medical educators and administrators are in no sense free agents, but are of necessity involved in that cultural "lag" with which sociologists and anthropologists have become impressed during recent years. The corollary of this is that if a critical examination of medical education is to prove fruitful for the delineation of the more serious shortcomings, it must be divested from the outset of all implications of personal censure and vituperation. Its goal must be singularly that of *improving matters*, the first step toward which, as Dewey long ago indicated, is a clear identification of the "felt need" for it.

This is the detached and impersonal attitude which the present article hopes to preserve. With this as a take-off, we now invite attention to

some of the more conspicuous faults in modern medical education.

1. Unrealistic Concepts of Motivation: Educational scientists of the present day have come to a clearer awareness than has ever before been evident that the learning process is to a considerable degree affected by the student's motivation. In fashioning techniques for teaching and learning they consider motivation on a parity with intellectual capacity, physical health, emotional stability, socio-economic status, previous educational background and habits of work. Much careful research has been turned to evaluating the role of motivation in achievement and, in the more progressive schools, active steps have been taken to incite the student's motivation for the particular task at hand. Thus, in the "activity program" of certain schools in New York City, an elaborate marionette show may be exhibited by professionals before the fifth-grade class. The pupils are later asked whether they would like to stage such a show. The response being in the affirmative, the students are directed at the numerous tasks of learning the speeches of the characters in the play, making the marionettes, designing and executing the costumes, stage, curtains, backdrops and "props," painting the scenery, planning dances, learning the historical and geographic backgrounds of the play, ethical and aesthetic implications and so on. Incidental to such activity, they acquire a rich fund of useful information in arithmetic and the algebra of proportions, in mechanical and electrical physics, in grammar, rhetoric and communication skills, in the fine arts, in human psychology and in group dynamics. Cooperation rather than competition is the underlying theme. What is of high significance, as brought out in

controlled studies, the principles and facts so acquired are generally better retained, recalled and reproduced than they are under the more orthodox "compartmentalized program."

In contrast to this orientation, most medical educators deal with premedical and medical students as if motivation is already a *fait accompli*, as if the mere declaration of the student's intention to become a physician or his voluntary matriculation in a college of medicine is ample guarantee that he will devote himself assiduously to the acquisition of all materials conceived by his basic science teachers as essential to the proper practice of medicine. The incorrectness of such assumptions can be attested by every student capable of honest introspection.

Many a premedical student entertains serious doubts that the physical principles, formulae and data he is asked to master in hydrostatics, hydrodynamics, adiabatic expansion, etc., bear in any way upon the practice of medicine. Taught under the compartmental systems, his motivation for acquiring such material is low. He has, to be sure, a motivation of sorts, but this is likely to be more immediately related to passing the next week's test than to the ultimate management of clinical problems.

Fortunately, this state of affairs need not exist. A single visit to the bedside of a patient in whom a tidal drainage apparatus is being employed to provide intermittent urinary elimination and a few well-directed questions by a clinician earnestly interested in problems of student motivation would tap resources whose existence might not otherwise be suspected or imagined.

Numerous similar examples could be cited to demonstrate how ineptly the factor of motivation is handled

in the medical schools as well as the premedical. The following is illustrative. A sophomore at the State University of Iowa was recently peering through his microscope, examining pathologic tissue, when an instructor stopped at his bench and posed a few routine questions bearing on the exercise of the day. The student, unable to furnish satisfactory answers, arose in bitter and unexpected reproach and demanded to know what "good" could be expected to accrue to him from all this detailed microscopic study—his intention was to become a psychiatrist! In such a situation, the onlooker's first inclination might be to endorse the instructor's open censure of the lad. The reaction, however, appears to be unrewarding. The fact that such a question can arise at all in the mind of the student is clearly a phenomenon that merits notice in its own right. The more mature course of action would be to ask one's self in what manner the school had failed to motivate the student properly. A proper answer to such a question would go far toward salvaging not only this student but others among his less vociferous companions.

2. Preoccupation With Psittacotic Answers: It is a regrettable circumstance that in the education of the medical student, as in his earlier formal and informal education, the highest premium is placed upon answers—parrot-like answers—while virtually none is placed upon his ability to ask questions.

As every parent knows, the pre-school child characteristically exhibits a high predilection for asking questions—sometimes embarrassing—pertinent questions. Further, the child's queries are usually highly extensional, in that the form of his questions provide palpable conditions for

reaching meaningful answers. This amazing capacity is, unfortunately, slowly attenuated and, as the child moves more and more among the adults of his social environment, comes to be all but extinguished. By the time he is well along in grade school he has often become quite content with isolated bits of information, i.e., with figures without background. He is glad to learn, for example, that the moon is some 238,000 miles from the earth and he seems especially pleased with himself if he can furnish this datum when occasion demands. He has not, however, perpetuated and further sharpened the habit of asking automatically *how* and *by whom* the datum was reached and to what extent it *checks with other fragments of information*, e.g., the statement that the equatorial circumference of the earth is approximately 25,000 miles.

The compartmentalizing of the medical curriculum has seriously compounded this felony. Each specialist responsible for giving a course seems imbued with the supreme importance of his specialty to the practitioner-to-be. At committee meetings he contends with his colleagues for more curriculum hours and, in the interests of "completeness," he crowds more and more "factual" data into his sessions. To further economize his time and effort, he develops the habit of speaking *ex cathedra*. Woe unto the student who, under examination, cannot furnish the structural formula for tyrosine and adrenaline, list the tissues of the body which have a high capacity for regeneration, give the normal levels of serum potassium, sodium and chlorides, and recite upon the organisms found in the progressive bacterial, synergistic gangrene of Meleney!

Somewhere in our travels we appear to have lost that interest, con-

spicuously exhibited by Claude Bernard and Thomas Henry Huxley, in a play-by-play familiarity with *how* answers are arrived at in the course of scientific inquiry. Lacking this, our students fall ever and again into errors that they should have been able to eliminate long ago. Repeated experience manifestly does not pay the dividends it should and the chief reasons for this regrettable circumstance seems to be that understanding is not habitually sought in its own right.

When the student does ask a question, he not infrequently exhibits an unbelievable naiveté in word magic. He evidently thinks that if a grammatically correct sentence terminating with a question mark can be formulated there must somehow, somewhere be an answer. *That the terms of the question themselves and the hidden and manifest assumptions inhering within them are the inevitable determinants of the answerability of the question does not appear to strike him as important.* The crowning disappointment is that so many of his teachers, even the most reputable of them, are equally naive in this respect.³²

In time, the student comes to acclaim most warmly that teacher who furnishes him with the *answers* he will need to gain high grades on tests, to pass the course, to graduate, to earn a coveted internship and to weather the examinations of the boards of medical licensure. Contrarily, his discomfiture and dissatisfactions are most acute in the presence of that teacher who makes the probabilistic and pathogenetic aspects of the sick individual the underlying theme of his teaching efforts. In a word, *for the student* symbol-manipulation comes insidiously to take precedence over the realities to which it supposedly corresponds.

All this contrasts strongly with the growing conviction derived from research in education—that to be intelligent is to be aware of relationships.

3. *Failure to Practice Scientific Method:* Despite the fact that the average senior at medical school has been exposed to scientific technology for upwards of seven years, he frequently proves wholly incapable of describing scientific method and is even less practiced in bringing scientific method to bear on the problems with which he is daily confronted. The reason for this is not hard to find: his preceptors commonly do not know or, knowing, do not themselves regularly practice scientific method. The latter observation can nowhere be better documented than in a critical review of technical articles prepared for publication in medical journals by his teachers and accepted by editors reputed to be discriminating. In the aggregate, it is no exaggeration to state that four out of every five articles are frankly impressionistic, prescientific or pseudoscientific.

Not only are the more familiar logical fallacies (e.g., *post hoc*, *ergo hoc*) committed over and over again, but there is a conspicuous lack of appropriate use of the principle of control; of the conviction that observation is the only authority that can be appealed to; of a proper feeling for statistics and of awareness of the arbitrary and the man-made character of nosologic classifications. Insubstantial dichotomies are allowed to survive and obfuscate our thinking.³⁴ Operationalism, that scientific outgrowth of logical positivism which has paid such rich rewards in the areas of physics and chemistry,^{7, 28} is virtually unknown to most teachers of medicine.

A recent episode in one of our mid-west medical colleges may be cited to illustrate how far a body of scientific

experts may unwittingly depart from scientific method in the endeavor to deal with a practical problem: that of "improving" the "orientation" of the junior class to the end that an "integrated view" of clinical medicine and its subordinate disciplines may be achieved. During the summer months, the curriculum committee decreed that the first eight weeks of the junior year should be devoted wholly to orientation lectures and demonstrations. This entailed, of course, a considerable revision of the older schedules, incommenced a number of teachers (without first consulting them to enlist their suggestions and cooperation) and called for college administrative adjustments of major proportions. In effect, the students sat in the amphitheater from 8 A.M. to 12 noon and from 1 P.M. to 5 P.M. five days a week for eight weeks, listening to integrated presentations of such subjects as headaches, hypertension, and peripheral vascular disease by panels of three to four faculty members drafted from various departments. (Each panel was required to meet apart from the students a week or more before its scheduled hour in order to make certain that the topic would be comprehensively covered, to reach agreement, wherever possible, on controversial issues and to plan the most effective sequences.)

The plan was executed as conceived. But what had been wholly overlooked in the experimental design was the delineation of precisely what *goals* were to be sought under the vague terms "better orientation" and "more integration"; the decision as to which *yardstick* should be used—and *by whom*—to ascertain whether the envisioned goals had been reached; a preliminary agreement as to what *criteria* should be invoked for

the overall evaluation of the experiment (in comparison with the conventional program); and a consideration of *other conditions* of presentation than those adopted. No "control group" was either envisioned or provided for. In brief, a considerable change had been arbitrarily implemented without the slightest possibility of determining whether it could in the final analysis be considered an "improvement" over the older system. If any "answers" were to be reached concerning the virtues of the new program they would have to be derived from fallible impression, intuition, inspiration or divine revelation—not by way of the method of science.

If this is the *modus operandi* endorsed by responsible faculty members it may be questioned whether we have any right to expect a better performance from students of medicine of whom they are the esteemed preceptors.

4. *Lack of Familiarity With the Nature of Perception and the Laws of Learning:* The manner in which classroom exercises and sectional demonstrations are conceived and executed and the procedures employed in effecting changes in the curriculum again and again reveal an ignorance on the part of medical teachers of such matters as the nature of discrimination, abstraction and generalization; the span of attention; the laws of primacy, recency, frequency, contrast and varying concomitants; the principles of learning by wholes; distribution in time; over-learning; retroactive inhibition; entelechy and figure-background relationships and the means of facilitating and measuring the psychologic processes of acquisition, retention, recall and recognition.

It does not appear to be generally

appreciated that learning is eminently an *active* process and that in the long run it is most economically brought about when the student learns by *doing* rather than by listening, watching and verbalizing. The latter have value, but *only* when the student has acquired corresponding referents—and this requires activity.

Closely bound up with these matters is the lack of clear realization of the faculty-student relationship and the conditions that foster such. Moore¹⁶ ventures to propose that both faculty and students are, in fact, students working at different levels of learning. This attitude tends to dissolve the archaic distinctions between student and staff that have for, lo, these many years proved inimical to the best conditions of work. Above all, it abrogates authoritarianism. Were it to be embraced by faculty members, the student could expect to be treated as a person, much as modern practitioners advocate the patient should be treated.

Not the least result of the adoption of this attitude would be its effect upon tests and examinations. In some schools and departments the student is kept completely in the dark regarding his score on tests. His papers are never returned to him; he is not encouraged to perform an "autopsy" on his own papers (although his teachers continually urge upon him the value of the autopsy in helping him correct clinical errors) and he is not made familiar with the errors commonly committed by his classmates. Least of all is he given cogent advice as to the techniques of preparing for and writing examinations. In brief, the teacher looks upon the examination solely as an instrument for evaluating the student. That it might be made a learning device, a means by which the student might measure his

own progress and by which the instructor might evaluate himself as a teacher are potentials frequently disregarded.¹¹

5. *Imperception of the Roles of Communication and Listening Skills, Group Dynamics and General Semantics in the Education Process:* Wendell Johnson²⁵ has asserted that the better part of science is its language. Be this or not, it is certainly true that the greatest portion of the scientist-teacher's time is spent in communicating—in listening, speaking, reading and writing. What is not generally appreciated by the medical educator is that these communicative processes constitute as legitimate objects of scientific study as the molecular exchanges of gases between blood and lung tissues and the circumstances under which porphyrins appear in the urine. Whether he wills it or not, they are his business, his stock in trade, and as such they deserve his sober attention.

Language clearly carries potentials for frustration and trouble as well as for organic adaptation, sanity and happiness. Failure, for example, on the part of the medical teacher to be aware of the entropy that unavoidably besets every communicative event, failure to expect that he will be misunderstood, at least in part, whenever he speaks and that he will misunderstand, at least in part, whenever he listens, is without doubt one of the most disruptive of influences with which the teacher and his students must deal. How often do we hear the remonstrance, explicit or implicit, "I told you thus-and-such; are you deaf or just stupid?" and the embarrassed apology, "O, I thought you meant —!"

Within the past 20 years two conspicuous projects, the group dynamics studies initiated by Kurt Lewin

and the general semantics methodology evolved by Alfred Korzybski, have uncovered valuable behavioral formulations and described inter- and intrapersonal techniques that permit humans to achieve greater harmony among themselves and greater control of their physical and psychosociologic environments. These principles, if systematically employed by faculty members, would almost certainly promote healthy communication among the several departments, reduce interdepartmental tensions, enhance efforts to set up and pursue overall goals, and perhaps achieve that "correlation" within the curriculum which has been so much honored in talk and so little implemented in action. "Better faculty communication," advise Darley and Turner,¹¹ "would lead to improved experience for the student."

The Search for Better Ways

Having followed the discussion up to this point the student of general education is likely to conclude that the teaching in our medical schools must be of a poor quality indeed. Actually, such is not the case. Despite the general lack of deliberate preparation in the field of education, medical teachers often do their work well.¹¹ "Some are born teachers," says Slobody,⁴³ "and do a good job without knowing anything about principles of education." It only remains for us to determine whether or not a better job and greater progress would result from a more specific training in educational science and research.

Happily, we do not lack for men of vision, originality, courage and catholic outlook. And while rigorous scientific method cannot be said as yet to have been brought to bear on a single facet of medical education, a start has been made, if only in the

sense that (a) more and more meaningful questions are being asked by leaders in the area, (b) issues are being ever more clearly defined and (c) a certain amount of necessary spadework has already been performed. These encouraging signs will be briefly reviewed.

1. *The Philosophy of Medicine.* For some centuries western medicine has embraced the ideal of *preserving life* as long as possible, *providing optimal function* for the individual in health and disease, and *offering comfort and assurance* to those in sorrow and pain. Until recently, physicians have complacently nurtured these ideals without concerning themselves with possible repercussions on other aspects of human endeavor—the ecologic welfare of the community, the law, nationalism, imperialism, religious and other socio-ethical institutions. It now appears that physicians must assume a role never before played in cooperating with their fellows to the end that extramedical and medical ethics may be brought abreast of one another.

Scientific method has been so successfully employed in medicine that the life expectancy of the newborn American infant is now 26 years greater than that of the child born in 1900. The population of North America is becoming increasingly "top-heavy" and geriatrics, as a branch of medicine, has assumed an unprecedented importance. Surely, it is but a matter of a few years before these measures will be brought to Asia, Africa and other "exotic" parts of the world.

Unfortunately, these scientific achievements have brought with them unexpected socio-economic problems. Ecologists and others^{50, 52} have closely calculated the arable acreage of the globe, actual and potential. Con-

vinced, as many of them are, that the biologic welfare of each individual requires at least 1.4 acres, they find a disquieting discrepancy between the world's population and the ecologic potential for sustaining it. Their extrapolations into the future sound a deeply ominous note for the next generation and we dare not shut our eyes and ears to them. What will the medical man of the foreseeable future have to say of the overall wisdom of current, rigid ideals? Of the political and economic concepts of free enterprise? Of the church, ethical concepts concerning contraception, abortion and so on? His participation in the efforts to solve community issues of this sort can no longer be postponed. It is gratifying to note that medical men are descending from their ivory towers in increasing numbers, humbly joining their fellows in the urgent tasks that confront all of us.

2. *The Philosophy of Medical Education.* Almost simultaneously within the past five years there emerged from Great Britain and the United States clear-cut formulations as to the aims of medical education.^{23, 26, 47, 48, 49} This constitutes a point of new departure. Henceforth, empirical experience can be used as a check against the newly issued code, modifying and being modified by it as necessity dictates.

Briefly summarized, the envisaged aims of the *premedical* course are "to inculcate the student with scientific method and provide him with the basic principles and data upon which the study of medicine should properly be founded . . . without any special vocational emphasis." The aims of medical education itself are to equip the student with sound basic principles, including the scientific outlook and method; a knowledge of the art of medicine and the fundamentals of

the medical sciences; competence in, and understanding of, certain indispensable techniques; and intellectual resourcefulness and initiative in the handling of unusual and unexpected situations.²⁶ Teamwork and a perception of the social and cultural settings in which medical practice is inevitably performed receive their long overdue notice.⁴⁷

3. *The Preparation and Selection of Students for Medical Education.* Less than a century ago it was unnecessary to have had even four years of study at high school before enrolling in a college of medicine. At about the time of the preparation of Abraham Flexner's¹⁸ now celebrated report on the lamentable state of medical education (1903-1910), Dr. Fred Zapffe induced the medical colleges to require two years of preliminary college work, study to be distributed among the physical sciences and the humanities. This period of preliminary study was later increased to three years and the most recent (1952) recommendation handed up by the Association of American Medical Colleges and the Council on Medical Education and Hospitals of the American Medical Association calls for a four-year course.

The admissions committees 4, 8, 14, 15, 23, 24, 38 are now asking such pertinent questions as: how should an admissions committee function? What sources of information concerning the candidate should be tapped in order to appraise his fitness for medical school work? What is the responsibility of the liberal arts college to the student planning the study of medicine, and how can it help the medical school in the selection of matriculants? What is the fate of rejected applicants, and how sure can we be that they would not have succeeded as medical students and physicians?

At present, the decision to accept or reject an applicant is in most schools reached in terms of:

1. Biographical material.
2. College grades (*general grade point average and science grade point average*).
3. Nature of collegiate courses taken.
4. Evaluation of the college attended (in full recognition of varying standards from school to school).
5. Letters of recommendation from persons who know the applicant well.
6. Personal interview(s).
7. Health and emotional stability of the candidate.
8. Scores on psychological tests (the General Aptitude Test Battery and the Medical College Admission Test).

With the exception of the liberal arts college grades, no very appreciable positive correlation coefficient between these items and the student's performance during the freshman year in medicine has been demonstrated. *Still less can they be made, a basis of prediction concerning the overall performance in medical school and the more important performance of the practitioner.* For that matter, no correlation studies have been projected by which performance in medical school might be made a forecast of the individual's performance as a practicing physician. The "late starter" generally fares poorly in our current impressionistic methods of predicting his future. Yet important questions and some preliminary studies concerning the value and optimal techniques of interview and the validity of and requisite revisions of the Medical College Admissions Test are discernible.^{23, 38, 44, 45} Finally, encouraging communication via liaison committees is being established between the liberal arts and medical colleges.

4. *The Medical Curriculum.* The gradual shift of emphasis from the particulate to the holistic consideration of the patient^{10, 19} has raised many corollary questions, provoked much of the desirable discussion that precedes reform and stimulated certain schools to try innovations never before implemented. These innovations can hardly be dignified by the term "experiments," for no yardsticks have been evolved by which the effects of the revised program on the student can be measured and no reliable control studies have been undertaken. The conviction has, however, been growing among medical educators that the student must not only participate but must be given a significant degree of responsibility in the provision of medical care for the patients assigned to him and their families. Several trial programs have been set up in which the student follows the patient into his home and familiarizes himself with the psychosocio-economic conditions that are produced by and which play a potent reciprocal role in the patient's illness.^{3, 5, 9, 11, 17, 22}

There has been a corresponding interest in a return (at least in part) to the old preceptor system.⁴⁶ In order to offset the predominating influence of "super-specialists" in the instruction of the medical student, the latter has been assigned for periods of from four to eight weeks to a reputable general practitioner. The student lives in the doctor's home, follows his daily activities and receives such instruction as only a general practitioner in his "natural habitat" can give.

Needless to say, these concepts of domiciliary practice and preceptorships have come in for a measure of criticism,⁵⁰ but this is a healthy reaction and essential to further progress.

Although the medical course is still

confined to four years, the student's time within this period has been more and more appropriated. Whereas he formerly attended medical college for but 32 weeks of the year, he is now attending, on the average, 36 weeks and in some years 44 or more weeks.¹ This extension of the course has become necessary because of the ever-growing content of the medical curriculum. It is obvious, however, that such encroachment cannot go on indefinitely and certain medical educators,^{11, 14, 19} realizing that in a four-year course the student cannot be expected to master all the factual information embraced by the entire field of health and medical activity, have urged a cooperative study by the faculty with a view to unloading the premedical and medical curricula of non-essentials and striving for inter-departmental correlation.

5. *The Faculty and Techniques of Teaching.* Some of the questions at present being discussed relative to the faculty are: What makes a good teacher? How is the teacher to be prepared? How is he to be recruited? Should medical schools strive uniformly for full-time teachers? How should the relations of full-time to part-time teachers and the community-at-large be defined? What are the desirable relationships among deans, faculty and administrative officers? How can communication between departments be fostered in the interests of an integrated curriculum? *While much lively debate rotates about these issues^{2, 10, 24, 35, 36, 37, 41, 42, 51} no truly scientific inquiries have as yet been designed by which dependable answers might be reached.*

As to techniques of teaching, the relative merits of lectures and other didactic methods, preceptorships and small, informal study groups continue to be examined. There is a growing

appreciation among the more progressive instructors of the virtues of (a) learning-by-doing and of (b) the employment of both vertical and horizontal correlation of subjects. In this connection the AAMC, sparked by Dean G. P. Berry⁶ of Harvard and supported by funds from the U. S. Public Health Service, the medical schools and private foundations, has recently sponsored a six-year program of "teaching institutes" in which medical administrators and teachers from various disciplines that "naturally belong together" (e.g., physiology, biochemistry and pharmacology) may meet in leisurely conferences of five days each with a view to increasing the effectiveness of medical teaching. A conference on world health and medical education met in London during August 1953.

The audiovisual aids to teaching—especially the conventional "silent" and "sound" movies, phase microcinematography, stereoscopic photography, three dimensional models, television and wire tape recording—have by now assumed a permanent place in medical education and are extensively exploited by many teachers.

All evidence points to the fact that medicine is now in a period of critical growth¹⁶ and far-seeing educators are inclined to agree with Page¹⁰ when he predicts, "The attitude of the doctor of tomorrow will be allied to the spirit of the beloved family doctor. He will be a practitioner of 'constructive medicine' a scientist trained in considering man as a whole human being. He will understand man's physiology and psychology and he will know that changes in man have a way of reacting on his whole environment and vice versa. The vitality of medical education rests with our ability to understand and transmit these concepts."

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The Third Year of Operation of the National Intern Matching Program

JOHN M. STALNAKER and EDWARD C. SMITH

THE NATIONAL INTERN Matching Program, Incorporated, offers an orderly method of intern placement consonant with American principles of individual freedom. Some 10,700 internships at 820 hospitals (each approved for internship training by the AMA) are offered each year to the 6,400-plus graduating seniors who seek internships. Some 4,500 internships will go unfilled, no matter what system is used. Approximately 1,500 of these positions are later filled by foreign trained graduates, second-year interns, etc. Competition among hospitals, therefore, is extremely keen. Certain popular hospitals have a plethora of applicants while others do not attract a single applicant. These popular internships are filled (146 hospitals were completely filled in 1954; 246 of the 1,032 separate intern training programs were filled), and this creates great student competition in spite of the surplus of internships.

The NIMP is completely controlled and operated jointly by the AMA, the American Hospital Association, the Association of American Medical Colleges, the Catholic Hospital Association and the American Protes-

tant Hospital Association. Two student representatives-at-large, with full voting rights, are members of the board of directors. It is a non-profit corporation.

The core of the matching program is freedom of choice for students and hospitals and the preservation of the bargaining rights of both. This freedom is the cornerstone of the program. Applications are initiated by student and hospital, and not by the matching program. Students apply to hospitals which interest them for whatever reasons appeal to them. Each student makes out, privately, a confidential preference list of internships, and each hospital confidentially ranks its student applicants. The student's confidential preference list gives him an opportunity to escape pressures from hospitals and advisors. The NIMP matches the choices as follows:

STUDENTS: Each student is matched with the hospital highest on his list that will accept him (i.e., that cannot fill with other applicants the hospital prefers to him). If his first choice hospital does not want him, his chances at his second (or third or fourth) are in no way diminished. Thus he goes only where he wants to go, and always to the internship he most desires which accepts him.

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HOSPITALS: Each hospital gets every one of its applicants it desires (to the number it specifies), provided that the applicant prefers this hospital to any other one open to him. If more applicants desire the hospital than the hospital has openings, the hospital's ranking list determines who the preferred men will be. If a highly ranked man goes elsewhere, by his own choice, the hospital's chances for lower ranked men are in no way reduced. The hospital gets only men it wants, and as many as it wants, *provided* it can attract enough applicants that prefer it to other hospitals.

Thus, in full freedom of choice, the plan works as a clearing house, not interfering with, but giving effect to the choices of both hospital and student. It has removed, insofar as possible, the great pressures that caused recriminations once common to the internship placement scene. The broken contracts, the pressuring and signing up of students long before the senior year for internship commitments and other undesirable aspects have now largely disappeared. An overwhelming majority of both students and hospitals felt that the initial matching program was successful. Operational improvements in techniques and more complete understanding have followed, and the "matching program" today has the continued support of hospitals, deans and students.

The matching program does *not* allocate, distribute or otherwise control interns or internships. It does *not* set quotas or approve hospitals for internship training. It does *not*, by its nature, favor any group of hospitals or in any way advise students where to intern.

The third matching plan for in-

ternship placement was successfully completed in March 1954, with the matching of 6,051 interns with the internships of their choice, taking into full account each hospital's evaluation of its applicants. There were 10,729 internships offered.

Matching Plan III saw more of the continuing progress that has marked the development of the program. There were fewer reported complaints of irregularities. That a somewhat greater general understanding existed was evident in the correspondence concerning the program. Participation remained at a high level.

At this completion of the third year it may be well to search for any patterns that seem to be developing. Students continue to give excellent support to the program. While it is very difficult to determine the exact total number of eligible seniors due to off-year quarter graduations, decisions to work toward a Ph.D., interning outside the U. S. or decisions not to intern at all, it appears that more than 95 per cent of all students seeking the internships covered by the matching plan participate. The actual numbers of students taking part have shown a steady increase, directly reflecting the larger graduating classes. The 1951-52 program had 5,681 participants, 1952-53 had 6,033, and this year there were 6,412 active participants in the final matching. Table I gives a comparison of the three years.

The number of hospitals has risen some 25 units since 1952, although the total number of interns being sought dropped by some 250 positions this year. This, combined with the increase in the number of student participants, raises the percentage of total positions filled to 56, as Table I indicates. A total of 820 hospital

The Third Year of Operation of the National Intern Matching Program

units,* of the 836 approved by the Council on Medical Education and Hospitals of the American Medical Association, participated this past year. There was a decrease of 70 in the number of different types of internships offered, which may account for the drop in total number of positions open. It is probable that these discontinued internship programs were mostly made up of types going completely unfilled in past years.

and straight pediatrics show higher totals than in 1952, though not over 1953. All other types showed decreases. The category of "other straight," including straight internships other than medicine, surgery and pediatrics, dropped from 61 to three.

Rotating general showed an increase of 44 positions, straight medicine of 16, but all other classifications offered fewer internships than

Table I
General Results 1952-53-54

Year	Participating Hospitals	Number of Intern Programs Offered	Total Positions Offered	Total Positions Filled	Per Cent Filled	Total Students Participating
1952.....	795	1068	10,414	5,564	53%	5,681
1953.....	808	1102	10,971	5,744	52%	6,033
1954.....	820	1032	10,729	6,051	56%	6,412

Table II gives a complete comparative breakdown of the various types of internships offered. Only two types showed increases this year over last. They were rotating general and straight medicine. Straight surgery

a year ago. Most noticeable was the "other straight" category, showing a drop of 131 positions from the previous year.

The "total interns matched with each type" again showed the vast

Table II
The Type and Number of Internships Offered and Filled through the Matching Plan during the Past Three Years

Type Offered	Hosps. Offering			Interns Sought			Interns Matched			Per Cent of Type Filled			Per Cent of Total Interns Matched		
	1952	1953	1954	1952	1953	1954	1952	1953	1954	1952	1953	1954	1952	1953	1954
Rotating gen.	721	741	766	8596	9299	9343	4479	4861	5092	52	52	55	81	85	84
Rot. emph. med. .	26	28	15	236	100	78	164	54	57	69	54	73	3	1	1
Rot. emph. surg. .	28	31	19	155	121	83	68	53	43	44	44	52	1	1	1
Other rotating	33	33	27	101	83	81	67	30	44	66	36	54	1	1	1
Mixed types	39	34	26	188	183	124	111	94	85	59	51	69	2	2	1
Straight med.	64	73	79	503	530	546	359	359	434	71	68	79	6	6	7
Straight surg.	56	64	61	364	377	358	202	194	231	55	51	65	4	3	4
Straight ped.	34	37	36	121	144	113	69	67	62	57	47	55	1	1	1
Other straight	67	61	3	150	134	3	45	32	3	30	24	100	1	—	—
Totals	1068	1102	1032	10414	10971	10729	5564	5744	6051	53	52	56	100	100	100

*Hospital units indicate "units" from the point of view of the matching program. All Army hospitals, for example, are taken together as one unit. Bellevue, on the other hand, is counted as nine units.

majority going to rotating types—some 5,236 individuals (87 per cent of all those matched). Straight med-

icine with 434 and straight surgery with 231 fall far behind.

The "per cent of type matched" column indicates the *relative* degree of success in filling. It will be noted that nearly all have increased relative to 1952, probably a further indication of elimination of unpopular types and the coincident greater success in filling those remaining.

The "per cent of total matched" column further indicates the dominance of rotating general internships. The group continues to hold some 85 per cent of all types offered. Little change is taking place.

Table III shows a two-year breakdown of degree of success in filling for hospitals classified by the number of internships being offered. "Number sought" is a rough index of hospital size, and thus the table gives an indication of the degree to which students were attracted to the various sizes of units in the two years.

and the lower third (0 per cent to 33 per cent filled) included 436 units, or a majority of all hospitals—53 per cent. Thus the wide difference in popularity of the various hospital units continues.

The totals column of Table III shows that no highly significant changes are taking place in total numbers of internships being offered. The only category showing a noticeable change is that including hospitals offering a total of 40-49 internships, where there was a drop of 40 per cent.

Looking down the totals column by success categories, we find that over the two years, the 100 per cent and the 0 per cent had increases of 34 and 40 units, respectively. The middle group, from 34-66 per cent, had a decrease of 62 units. The "success" pattern (filling or getting none) seems to be established and growing.

It may be noted that students were attracted to small hospitals as well

Table III

Hospitals Classified by Degree of Success in Filling (by Percentage Filled) and the Total Number of Positions Being Offered (Relative Size)

Number Sought	100% filled		67-99% filled		50-66% filled		34-49% filled		1-33% filled		0% filled		Totals	
	1953	1954	1953	1954	1953	1954	1953	1954	1953	1954	1953	1954	1953	1954
1-9	34	42	36	32	33	26	13	9	85	65	202	238	403	412
10-19	54	69	42	59	33	27	25	17	80	71	37	44	271	287
20-29	9	13	15	15	9	4	7	7	12	8	5	2	57	49
30-39	7	15	14	14	6	5	7	6	6	3	0	0	40	43
40-49	1	1	6	3	4	2	5	1	4	5	0	0	20	12
50 up	7	6	7	9	1	1	1	1	1	0	0	0	17	17
Total	112	146	120	132	86	41	58	41	188	152	244	284	808	820

In 1954, some 430 of the 820 hospital units, over half, either filled or attracted no students at all. The upper third in success in obtaining the total number of interns sought (those units filling 67 per cent or over), included 278 or 34 per cent of the hospital units, the middle third in success (34-67 per cent filled) claimed only 82 units or 10 per cent,

as large ones. Units offering one to nine positions showed an increase of eight units in the completely filled group, of 36 in the completely unfilled category and a drop of 35 in the area in between.

Table IV is a detailed breakdown for the two years by "type of institution," per cent filled and number of interns involved. "Type of insti-

The Third Year of Operation of the National Intern Matching Program

Table IV
The Percentage of Interns Sought Who Were Obtained for Major Teaching

Per Cent Filled	MAJOR TEACHING HOSPITALS									MINOR TEACHING HOSPITALS								
	1952			1953			1954			1952			1953			1954		
	Interns			Interns			Interns			Interns			Interns			Interns		
	Hosp.	Sought	Matched	Hosp.	Sought	Matched	Hosp.	Sought	Matched	Hosp.	Sought	Matched	Hosp.	Sought	Matched	Hosp.	Sought	Matched
100%	31			39	897	897	48	1032	1032	13			11	177	177	17	260	260
67-99%				40	1419	1153	51	1655	1390				13	162	133	11	135	112
50-66%	106			18	543	304	16	439	251	60			7	109	57	8	100	52
34-49%				17	450	194	12	365	156				8	170	64	6	93	37
1-33%				23	480	95	14	300	75				20	233	42	14	187	34
0%	15			12	87	0	13	106	0	12			20	205	0	24	175	0
Total	152	3828	2634	149	3876	2643	154	3897	2904	85	1047	461	79	1056	473	80	950	495

tution" is based on the categories of "major-teaching," "minor-teaching" and "unaffiliated," as designated in the "Internship and Residency" number of the *Journal of the AMA*. From the table the higher degree of attrac-

tion of the major-teaching units is evident. In 1954 they offered 3,897 positions, or 36 per cent of those offered under the program. They filled 2,904 of these, or 75 per cent of the positions that they had.

Table V
Hospitals Classified by Stipend

Amount of Stipend	100% FILLED						67-99% FILLED						50-66% FILLED					
	1953			1954			1953			1954			1953			1954		
	Interns			Interns			Interns			Interns			Interns			Interns		
	Hosp.	Sought	Matched	Hosp.	Sought	Matched	Hosp.	Sought	Matched	Hosp.	Sought	Matched	Hosp.	Sought	Matched	Hosp.	Sought	Matched
\$ None	9	142	142	0	0	0	5	163	146	0	0	0	2	15	8	0	0	0
1- 25	6	111	111	10	214	214	19	716	589	15	567	469	11	327	189	8	304	170
26- 50	12	222	222	17	339	339	17	425	338	14	274	227	11	149	80	2	28	14
51- 75	21	529	529	22	339	339	11	193	161	17	494	417	12	298	160	4	78	44
76-100	19	207	207	25	373	373	22	304	246	19	320	253	14	145	80	11	124	72
101-150	23	216	216	20	269	269	32	447	351	31	520	443	17	147	80	18	179	97
151-200	13	208	208	30	362	362	9	134	105	24	249	190	16	143	78	16	211	120
201-250	3	57	57	7	157	157	4	29	22	7	72	51	1	10	5	1	10	5
251-300	1	5	5	4	19	19	0	0	0	0	0	0	0	0	0	3	22	11
Over 300	0	0	0	1	12	12	0	0	0	0	0	0	0	0	0	0	0	0
No inf.	0	0	0	6	114	114	1	21	18	2	83	75	1	2	1	1	16	10
Total	107	1697	1697	142	2198	2198	120	2432	1976	129	2579	2125	85	1236	681	64	972	543
Fed. Ser.	5	497	497	4	458	458	0	0	0	3	59	43	1	40	20	1	12	7
Grand Total	112	2194	2194	146	2656	2656	120	2432	1976	132	2638	2168	86	1276	701	65	984	550

Hospitals, Minor Teaching Hospitals and Unaffiliated Hospitals

NON AFFILIATED HOSPITALS									TOTALS								
1952			1953			1954			1952			1953			1954		
Hosp.	Interns		Hosp.	Interns		Hosp.	Interns		Hosp.	Interns		Hosp.	Interns		Hosp.	Interns	
	Sought	Matched		Sought	Matched		Sought	Matched		Sought	Matched		Sought	Matched		Sought	Matched
62			62	1120	1120	81	1364	1364	106	0	0	112	2194	2194	146	2656	2656
294			67	851	690	70	848	666	0	0	0	120	2432	1976	132	2638	2168
			61	624	340	41	445	247	460	0	0	86	1276	701	65	984	550
			33	474	104	23	307	125		0	0	58	1094	452	41	765	318
			145	1611	284	124	1308	250		0	0	188	2324	421	152	1795	359
202			212	1359	0	247	1610	0	229	0	0	244	1651	0	284	1891	0
558	5539	2469	580	6039	2628	586	5882	2652	795	10414	5564	808	10971	5744	830	10729	6051

Minor-teaching units are a relatively small group. This year they offered 106 fewer internships and got 22 more interns. The 100 per cent filled category increased by six units and 83 interns. The middle groups

were down slightly, and four more units were in the 0 per cent group.

Unaffiliated hospitals, which comprise 586 of the 820 units in the program, received 2,652 interns or an increase of 24 over last year. They

Offered and Percentage Filled

34-49% FILLED						1-33% FILLED						0% FILLED						TOTALS					
1953			1954			1953			1954			1953			1954			1953			1954		
Hosp.	Interns		Hosp.	Interns		Hosp.	Interns		Hosp.	Interns		Hosp.	Interns		Hosp.	Interns		Hosp.	Interns		Hosp.	Interns	
	Sought	Matched		Sought	Matched		Sought	Matched		Sought	Matched		Sought	Matched		Sought	Matched		Sought	Matched		Sought	Matched
4	125	56	0	0	0	0	0	0	1	12	2	0	0	0	0	0	0	20	445	352	1	12	2
7	188	85	3	104	46	9	239	54	2	49	14	5	30	0	2	20	0	57	1611	1028	40	1258	913
6	105	41	5	112	42	15	277	40	6	123	26	22	180	0	15	99	0	83	1358	721	59	975	648
6	109	41	5	114	50	32	494	75	22	364	63	32	279	0	26	217	0	114	1902	966	96	1606	913
14	184	76	9	127	52	55	570	97	30	292	55	86	523	0	85	606	0	210	1933	706	179	1842	805
12	168	65	9	164	70	40	362	75	43	434	86	67	433	0	87	531	0	191	1773	787	208	2097	965
4	97	40	6	72	27	27	246	57	32	323	70	21	124	0	43	242	0	90	952	488	151	1459	769
2	28	11	2	18	7	3	28	7	11	102	24	7	28	0	13	76	0	20	180	102	41	435	244
0	0	0	0	0	0	0	0	0	1	6	1	0	0	0	0	0	0	1	5	5	8	47	31
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12
0	0	0	1	14	5	0	0	0	1	12	1	1	4	0	8	55	0	3	27	19	19	294	205
55	1004	415	40	725	299	181	2216	405	149	1717	342	241	1601	0	279	1846	0	789	10186	5174	803	10037	5507
3	90	37	1	40	19	7	108	16	3	78	17	3	50	0	5	45	0	19	785	570	17	692	544
58	1094	452	41	765	318	188	2324	421	152	1795	359	244	1651	0	284	1891	0	808	10971	5744	830	10729	6051

The Third Year of Operation of the National Intern Matching Program

Table VI
Students Matched in 1954 Classified
by Stipend Obtained

Stipend	Number Matched	Per Cent of Total Matched
\$0-50	1563	26%
\$51-100	1718	28%
\$101-200	1734	29%
\$201-up	287	5%
No information	205	3%
Federal services	544	9%
Totals	6051	100%

offered 5,882 positions. In the two years there has been an increase from 62 to 81 in the number of unaffiliated units that completely filled, involving an increase of 244 interns matched. Carrying along the pattern noted with the teaching units, the unaffiliated middle success groups also declined in numbers. (The 34-66 per cent filled units declined by 30. The 0 per cent category gained 35 institutions.)

The total columns show that the 67-100 per cent filled units got 4,824 interns. The 0-66 per cent group got 1,227.

Since there has been increasing interest expressed in the last several years, in stipends, and in their relationship to success in getting interns, Table V reports the experience of the last two years in this regard. No attempt was made to evaluate remuneration other than the money amount listed in the JAMA.

The Table V totals column shows that a general stipend increase is

taking place. All money categories from \$0-\$100 show fewer hospitals than last year. All above \$100 have increases. The \$0-\$100 group lost 109 hospitals. The \$100 up group gained 107 hospitals. The \$151-\$200 category gained a notable 61 units, a substantial shift for one year.

Table VI is a simplification of Table V, showing only 1954 figures. There seems to be little reason to conclude, from the table, that stipend plays an inordinate part in attraction of interns. Hospitals offering internships at stipends between \$25 and \$200 claim most of the interns.

Table VII shows the degree to which hospitals were matched with their top choice men. For the purposes of the table, the applicants to a given hospital were divided into four groups, as follows:

If a hospital has offered five positions, the first five ranked applicants are, for the purposes of this table, counted as Rank Group I. The next five are Rank Group II. The next five are Rank Group III. The remainder are indicated as "Others."

In the actual matching, of course, no such arbitrary "group" distinctions are made. Each applicant is in order of preference and is matched that way.

It will be seen that a slight drop in the percentage in the high ranked group has taken place. It may reflect a better understanding of the program on the part of hospitals—a willingness to rank a wanted man

Table VII
Hospital Rankings of Interns with whom matched

Year	% Rank Group I	% Rank Group II	% Rank Group III	% Others	Total
1952	74	18	6	2	100
1954	71	21	6	2	100

high even though the chances of getting him are slight. The matching plan is so designed that missing a high ranked man in no way reduces chances with lower choices. This enables a hospital to form a completely realistic ranking list in exact order of real preference, and each year there is a better understanding of this feature.

This year 6,412 students used the matching plan, with 6,051 being matched and 361 going unmatched. Table VIII below shows some comparative data on students over the three-year period.

Table VIII
Applications Per Student

Year	No. Students in Plan	No. Applications	No. Per Student
1952	5681	21,728	3.8
1953	6033	19,416	3.2
1954	6412	21,579	3.4

The applications per student shows a .4 decrease in the three-year period, or a drop of 10 per cent, probably accounted for by the increasing student realization of the plenitude of positions.

Table IX indicates what choice the students are being matched with. There has been little change over the period. Students continue to get over 80 per cent of their first choice

positions. The drop of 3 per cent this year in first choices may indicate a greater use of "flyers," the student term for placing at the top of his preferential list an internship for which he feels he has little chance. Since the matching plan does not penalize these "flyers" (his chances with his lower choices are in no way diminished), they may be expected to increase, at least slightly, in future years.

Students apply to hospitals where they subsequently decide they do not wish to intern. They mark such hospitals "X" on their confidential rating blanks. There were in 1954, 2,881 or 13 per cent of the 21,579 applications reported which were so marked. The hospitals in turn do not wish to accept certain of their applicants, and they mark as "X" some 2,931 applications (14 per cent). In 553 cases both student and hospital agree in rating the other "X."

The matching program has agreed to match married couples, upon request, to the same hospital, or to hospitals within the same city. In 1954, there were 41 couples who requested being matched together. Of these 41 couples, 38 were so matched and three remained unmatched. In each case the couple goes to the highest hospital on their list that will accept both.

Table IX
Percentage of Students Matched by Order of Choice

Year	Per Cent 1st choice	Per Cent 2nd choice	Per Cent 3rd choice	Per Cent Higher choices
1952	84	10	3	3
1953	85	10	3	2
1954	82	11	4	3

Electrical Kymographic Recording Methods

GEORGE D. DAVIS and FRANK G. AT LEE

SINCE LUDWIG's introduction of smoked paper writing more than 100 years ago, the method has been a fundamental tool for both researchers and students of physiology, pharmacology and allied fields. During these years great advances in instrumentation have been made, yet the smoked paper writing system has remained essentially unchanged in research and particularly in teaching. Generations of students have left courses in physiology and pharmacology with memories of the idiosyncrasies of the recording method far stronger than their memories of the effects recorded. Various other writing techniques utilizing ink, waxed paper, heated stylus and electrosensitive paper have been produced in recent years. These methods and others have achieved widespread acceptance in commercial and other research laboratories, but have not as yet been introduced into many teaching institutions.

A report outlining a system using the electrosensitive paper was published by Maison and Haterius in 1947.¹ The authors explained their reasons for the use of this paper and the methods by which they had adapted it to physiological work, and expressed their full satisfaction with the change. Several apparatus sup-

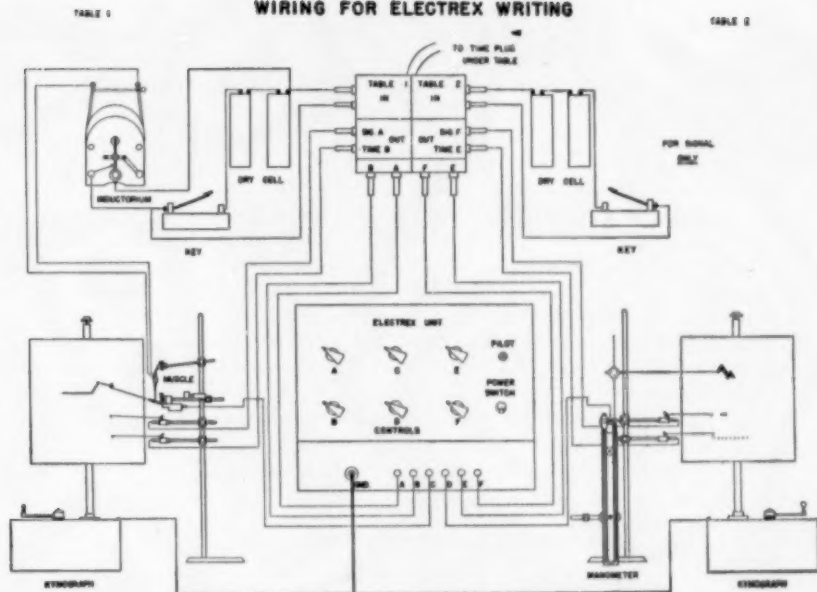
pliers have since made some of the basic equipment available. However, in the five years since the appearance of this paper, less than 10 per cent of the medical schools in the country and an even smaller percentage of other institutions teaching physiology and pharmacology have changed to this technique. Maison included an excellent list of the reasons for the change from smoked paper. These are essentially the elimination of the messiness involved in the use of smoked paper and the simplification of recording techniques. The electrosensitive paper is also superior to ink writing and to heated stylus methods since ink writing has an inherent messiness in the hands of the inexperienced in addition to clogging difficulties, while paper for the heated stylus method is more expensive and less durable than the electrosensitive type.

When the present authors decided to convert the student laboratories of physiology and pharmacology to a new writing system, it was originally planned to follow the techniques outlined in the paper referred to earlier. However, it rapidly became clear that these techniques and modifications were not readily adaptable to this laboratory. Many alterations therefore, have been made while preserving the essential ideas expressed by Maison. It appears probable that diffi-

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FIGURE 1

WIRING FOR ELECTREX WRITING



IN FIGURE 1 (above) is shown the basic system as used by two groups working independently.

culties due to the nature of existing installations may have dissuaded many people from similar projects. It is hoped that the techniques described here will enable more teaching and research institutions to make an easy conversion to an improved system of physiological recording.

Details of Apparatus

PAPER: The electrosensitive paper used in this system is the "Teledeltos" recording paper, developed by Western Union Telegraph Company and distributed by several of the scientific supply houses. This paper has a grayish white surface with a metallized backing. In use, currents of low strength flow from writing styli ap-

plied to the face of the paper and are passed by the metallized backing to the kymograph drum which acts as a return circuit. This current flow causes a black mark or line of excellent contrast. The paper is available in high and low resistance types. Tests have shown that the low resistance paper is the only suitable type for physiological recording. It may be purchased in rolls cut at any specified width.

POWER SOURCE. The ducting and trolleys explained in the previous paper were not considered desirable as a means of distributing power to student laboratory desks. However, several of the scientific supply houses have recently developed units which supply a number of current outlets.

The units* purchased supplied six writing circuits, a number sufficient to be shared by two student groups working on nonmammalian preparations or used by large groups working on complex mammalian experiments.

TIME AND STIMULUS SIGNALING: The laboratory is equipped with a time signal circuit having an outlet at each student work table and controlled from a central selector system. The time signal is a six-volt AC current delivered from a large transformer. In the electric writing system moving signal pens, magnetically operated, are unnecessary and difficult to modify. Furthermore, the mere turning on and off of the writing current is sufficient for time and signal marking purposes. Therefore, it was decided to utilize relays in such marking. The time marking relay chosen operates on six volts AC to utilize the previously existing system, while the signal relays used operate on three volts DC and are connected to dry cells in parallel with the inductorium stimulator. The relays are housed in a small metal box and are connected to the power supply, dry cells, and writing levers by plug cords and to the timer circuit by a fused line cord. The top of the relay box is marked as shown in the center top of Figure 1.

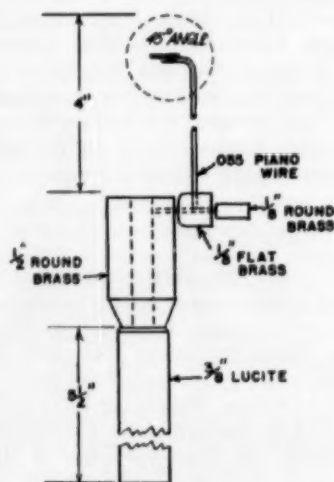
WRITING LEVERS: The "fall away" (or preferably "constant pressure") system outlined by Maison has been used in all writing styli. However, the designs have been modified to make the instruments more substan-

tial and trouble free. Each lever must be insulated from all other levers and from the kymograph itself. Plastic rods replacing the normal supporting rods of the levers are the simplest solution. Provisions also must be made for convenient connection with power supply. Unfortunately, satisfactory writing levers are not as yet commercially available. The manufacture and conversion of writing equipment is the longest and most difficult part of the change to electric writing. However, any reasonably able machinist is capable of doing the work required. It is to be hoped that such writing levers will become available from the apparatus suppliers and thus eliminate the remaining objection to the use of this system.

A. Signal marking styli: (Figure 2.) These styli are made from a piece

FIGURE 2

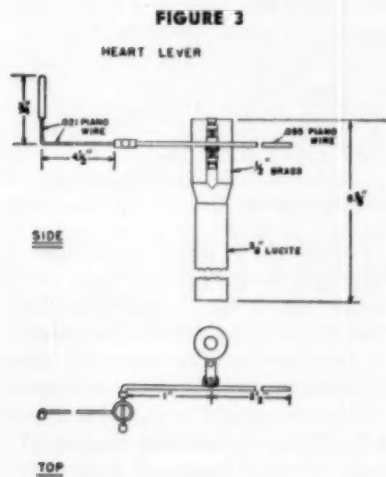
SIGNAL LEVER



*The Electrex writing unit is manufactured by Gorrell and Gorrell, Haworth, N. J. This unit provided a rectified AC current with an average writing current of 2 ma. Fixed limiting resistors prevent the output of more than 10 ma. at any time. These units are shipped with a large filter condenser in the circuit which insures a steady current flow but also considerably increases the unpleasantness of accidental shocks. Because of this, the condensers were eliminated from the circuit before the units were put into general student use.

of $\frac{1}{2}$ -inch brass rod, about 1-inch drilled and threaded at one end to take a length of lucite rod $\frac{3}{8}$ -inch in diameter. The other end of the brass rod was drilled to hold a standard banana plug, while a small hole was drilled at right angles to that used for the plug. An 0.055-inch steel wire fulcrum was inserted in this last hole and the fulcrum was then tinned with pure solder to prevent corrosion. Following this a block of brass about $\frac{1}{4}$ -inch square and $\frac{1}{8}$ -inch thick was drilled as shown in Figure 2. The block was slipped onto the fulcrum and a length of 0.055-inch music wire was slipped into the remaining hole in the block and crimped tight. A small brass cap was soldered to the top of the fulcrum to give sufficient clearance for free motion. The tip of the .055-inch music wire was bent as shown and a steel phonograph needle with a rounded tip was soldered to the end.

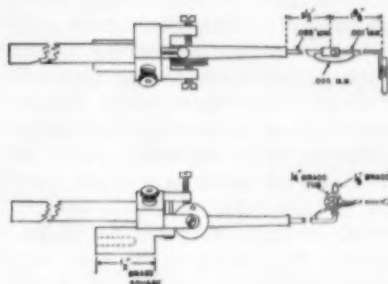
B. Heart levers: (Figure 3.) The heart lever is begun with the same $\frac{1}{2}$ -inch brass rod used in the signal stylus, but instead of the small hole



drilled to receive a fulcrum, one side of the brass rod is flattened and the fulcrum from a regular Harvard heart lever is soldered with its axis parallel to that of the brass and plastic rod. A 4-inch length of 0.055-inch steel music wire is soldered to the fulcrum extending $1\frac{1}{2}$ inches forward and $2\frac{1}{2}$ inches back. The terminal $\frac{1}{2}$ inch on the short side is bent upward and tinned. A section of $\frac{1}{4}$ -inch brass tubing about $\frac{1}{8}$ -inch wide, is cut and drilled at right angles to the axis to fit freely on the tinned

FIGURE 4

MUSCLE LEVER



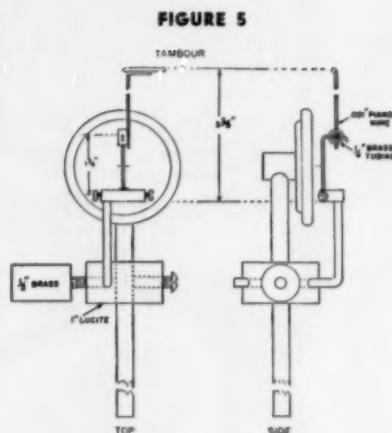
fulcrum. The fulcrum is then capped with a bit of brass as above. A 5-inch length of 0.021-inch steel music wire is soldered to the swivel at right angles to the fulcrum and the end is bent and tipped with the rounded phonograph needle.

C. Muscle levers: (Figure 4.) The Harvard isotonic muscle lever is modified as follows. A brass block drilled to receive a banana plug is attached as shown. The bakelite block incorporated in the lever inculcates the regular handle from the modified stylus. A 5-inch length of 0.055-inch music wire is soldered into the hole normally occupied by the straw or

wood writing arm. The tip of this is bent upward at a right angle and tinned. A swivel and cap as for the heart lever are placed on this fulcrum. A 2-inch length of 0.012-inch music wire is attached to the swivel and terminated with the phonograph needle tip. Because of the fast movement required of a muscle lever, the swing must be controlled to prevent bouncing of the tip. For this purpose a spring is made either of hair spring brass or of very light steel wire. One end of this spring is attached to the heavy wire lever and the other is fastened to the swivel.

D. Tambours: (Figure 5.) The Harvard Marey tambour is modified in the following way. The adjusting sleeve or block is replaced by a half-inch length of one-inch lucite rod. This rod is drilled through its axis to fit the tubing handle of the tambour. At a right angle to this hole, a hole is drilled from the side and tapped to receive a #10 machine screw to serve as a set screw to prevent rotation of this collar. A small hole is drilled secantly through the collar opposite the set-screw to hold the swivel support. A second set-screw hole is drilled and tapped at right angles to this support hole. The set screw for this hole is soldered to a one inch length of $\frac{1}{2}$ -inch brass rod drilled to take a banana plug. To the swivel is attached a stylus constructed as for the heart lever, except that the short pivot piece should also be of 0.021-inch steel wire. Writing current is kept from the tambour and supports by the plastic block and the rubber membrane.

E. Manometers: After many experimental designs had proved impractical, the method used by Maison was adopted with certain modifications. The basic brass fitting and lucite handle of the signal marker are used,



but a small steel hook is inserted in place of the pivot. From this hook a fine copper wire is suspended with a small brass weight on the bottom. The rod is attached to the support above the manometer in such a way that the wire exerts a slight even pressure against the manometer stylus, which is tipped with the usual blunted phonograph needle. The current path is then from the brass fitting, down the wire and along the stylus to the paper. Methods using the mercury of the manometer as a current path are undesirable as they provide an electrical contact with the animal preparation.

Use of the System

In normal operation styli recording physiological events (tambours, manometers, etc.) are connected directly to the power supply unit. The signal and time styli are connected to the relay box which is in turn connected to the power supply as shown in Figure 1. All connections are made with rubber covered test lead wire ter-

minating in banana jacks. None of the writing levers are permanently connected, resulting in a reduction in the number of wires necessary.

When all connections have been made and when the preparation is ready for recording, the power supply is turned on and the rheostats controlling the current of individual styli are adjusted to satisfactory writing intensity. At times the points of the styli will become rather thickly covered with black fuzz from the paper, producing a slightly smudged record. This usually can be overcome by simply wiping the points with cloth or gauze, but on occasion it is necessary to use emery paper or steel wool to obtain a clean writing point. The record may be written on with pencil or ink at any time and requires no processing or special handling when removed from the drum.

Student Reaction

This system was tried on an experimental basis for over a year by several student groups and in staff research projects. Following these tests the system was installed in the entire laboratory and was first used by a class of second-year students for pharmacological experiments. This class had previously had the physiology course and was experienced in the use of smoked paper. After considerable work with the new system, this group was polled by secret ballot to determine their reaction to the change. Of the group of 110 students, 90 per cent thought the records obtained with electric writing were better than those obtained with smoked paper. Ninety-eight per cent considered the electric system easier to use.

In any system of electric writing it is difficult to eliminate the possibility

of a harmless but unpleasant shock. However, to obtain such a shock, contact must be made simultaneously with both the kymograph and with one or more of the writing styli. It is easy to learn to operate the system without receiving a shock and such care does not interfere with the experiments in any way. When asked, only 45 of the students reported experiencing a shock and of these more than half had received a shock on only one occasion. Thirty-seven of the students considered the shock quite mild and only three reported that the shock had made them apprehensive about using the system.

In answer to our final question, the class voted unanimously to continue the use of the electric system. In addition to this formal report many students have made spontaneous favorable comments and useful suggestions for minor improvements. The acceptance by the students has been even more enthusiastic than anticipated.

Summary

A conversion of a physiology-pharmacology laboratory from smoked paper to electric writing has been discussed. While such an installation must be tailored to fit the needs of a given classroom, the advantages to both students and teacher such as to justify consideration of the method by all those responsible for the training of students in physiological and pharmacological work.

REFERENCE

1. MAISON, G. L., and HATERIUS, H. O.: "The Application of Electrical Recording Methods to the Student Laboratory for Physiology and Pharmacology," *Journ. Assn. Am. Med. Coll.*, 1947, 22, pp. 200-209.

Editorials and Comments

Premedical Advisors

PREMEDICAL ADVISORS CAN MAKE valuable contributions to the selection of well qualified medical students when a free-flowing communication has been established between the advisors and the medical schools. Organized conferences between premedical advisors and admissions committees are a mechanism by which such communication can be developed.

In the evaluation of applicants, premedical advisors are in a unique position to supply pertinent information. The four years of continuous contact between the premedical student and his advisor bring out facets of character which cannot be appreciated in the 30 minutes of basically stressful contact which is usually the atmosphere of the interview by a medical school admissions committee. But to make this contribution, premedical advisors need to be aware of the information that medical schools desire on an applicant.

Perhaps the premedical advisor is best qualified to make a judgment on motivation for medicine. In many instances, by the duration of their contact, they can report on the student's growth and development as an educational subject.

In a recent conference with premedical advisors, several pertinent questions were raised. What kind of students are sought by medical schools? In the final throes of selection how much attention is actually paid to a liberal education? What factors are considered in making a determination in regard to motivation? Would not the admissions officer's interview be more effective if held in the environment of the undergraduate institution? What are the medical schools doing to improve processes of selection?

Undoubtedly a number of medical schools have given serious thought to their relations with premedical advisors. The study by Severinghaus, Carman and Cadbury should stimulate careful consideration of this important aspect of medical education.—J.Z.B.

The British College of General Practitioners Looks at Undergraduate Medical Education

BASED UPON THE results of a questionnaire directed to general practitioners, the Undergraduate Education Committee of the First Council of the College of General Practitioners has recently published an interim report on the British medical curriculum.¹

With regard to the school education of the premedical student, it was the general belief of those questioned that there was perhaps too much time being devoted at present to chemistry, physics, botany and zoology and that it would be well if "the last two years at school should be evenly divided between receiving a broad education and an introduction to the scientific method."

In selecting students for admission to medical school it was recommended that character, home background, heredity and school record all be given about equal consideration and that there should be a general practitioner on each selection board.

The present curriculum was thought to require a too detailed knowledge of anatomy; a needless expenditure of time in watching complicated specialized surgical techniques which will be used only by a few; an excessive amount of time on the diagnosis of obscure conditions; too little teaching of "the simpler variations in health and disease," and too little attention to the needs of general practice.

Lord Horder² was quoted as favoring "less time over the intimate structure of the organ of Corti and the theories of color vision and more time over simple instruments by which the structure and function of the normal body are studied—I still meet doctors who have never seen the optic disk clearly, nor the vocal cords at all."

It was recommended that medical principles should generally be demonstrated on a disease which is common rather than rare and that more attention be given dermatology, orthopedics, psychiatry, allergy, rheumatic disorders, diseases of the ear, nose and throat, pediatrics and geriatrics.

Continuity of responsibility was pointed out as the one main characteristic of general practice and the following ways of teaching this to the student were suggested: a student accompanying his instructor on consultation visits in homes; student reading of letters sent in to the hospital by the general practitioner in referring a case, and the letters sent back to the family doctor by the consultant; student attendance at health centers or general practice teaching unit attached to the medical school; preceptorships under general practitioners.

It was concluded that "all doctors are members of a team and the student must be taught that, for the patient's benefit, the coordination of all the different functions of the team is the responsibility of the family doctor."

It is interesting that much of the thinking revealed in this report closely parallels that presented in a similar report, recently made by the committee on undergraduate education of the American Academy of General Practice.³ Both of these reports are well worth careful study by the curriculum committees of all our medical schools.—D.F.S.

1. The Undergraduate Education Committee of the First Council of the College General Practitioners. "The Medical Curriculum," *Brit. Med. Journ.*, May 15, 1934.

2. LORD HORDER: *Brit. Med. Journ.*, 1931, 2, 1359.

3. JESSE D. RISING, Chairman, Committee on Undergraduate Education: "Preliminary Report, Undergraduate Education for General Practice," American Academy of General Practice, 406 W. 34th St., Kansas City 2, Mo., 1952.

Audiovisual, 1984

IN A RECENT ARTICLE* Dr. William B. Bean warns of the possible depersonalization of medical education with the development of newer mechanical aids to teaching. He is apprehensive that, in 1984, "the whole transaction of medical education and practice, dispensing with the mind and person, will have reached journey's end in total mechanization." This cannot be a prediction, but a warning which should be heeded because two things seem certain. First, by 1984 many more materials and machines will inevitably be used by teachers and, second, not in all instances will these newer materials and machines be used to actually further the teaching process. But there is no reason to expect all-out treason to teaching. The audiovisual materials and equipment of 1948 will not replace the mind of the person and they will make a contribution to the extent that they facilitate communication between mind and mind or person and person.

There is no doubt that the advent of the textbook complicated the teaching process and was accepted with caution if not resistance. The textbook, the blackboard, the microscope and the fluoroscope, and even the patient are now accepted with calm and sobriety in spite of all the dangers and instances of misuse. They have not reduced the role of the teacher, but rather have enhanced his ability to communicate.

Medical educators have never been slow in utilizing audiovisual materials, perhaps because they have been relatively immune to pedagogical tradition. Materials such as slides, models, specimens, cadavers and actual patients are the rule rather than the exception. There is no doubt that the newer materials such as movies, cardioscopes, auscultation tapes, television and whatever else may come also will be used to a certain logical advantage. There will be errors, delays and justifiable resistance until better materials for each medium can be developed and teachers become adjusted to the increased means and methods of communication. Some of the materials, old and new, are not yet suitably developed or adapted and, good as they may become, they will complicate the teacher's role rather than simplify it. As a personal arranger of learning experiences his teaching personality will continually encompass a greater variety of materials and methods selected from the new and the old.

The ace teacher of 1984 will use more materials to better advantage because he will have learned by experience and precept where they can be used more effectively in the teaching process. The teacher will not, for example, tolerate a reduction of his personal contact with the student nor will he tolerate the case record film to replace an available patient. If the film will not assist the student to better learn from patient contact it will not be used. Television must not replace the teacher as a person. Indeed, the teacher should expect the newer materials and machines to take over more effectively some of the routine mechanical details and leave him more time for individual attention to students.

More materials and equipment, now artificially categorized as "audiovisual," will be used to better advantage in 1984. In the meantime they should be subject to the honest trial, selection and consideration accorded them by Dr. Bean and his associates: "We have discussed and brooded

over the newer audiovisual aids. We use a few really fine movies to emphasize points which they are able to put across better than we can with any other method."—J.E.F.

*BEAN, WILLIAM B.: "A Department of Internal Medicine." *Journ. Med. Educ.*, Vol. 29, June 1954, p. 17.

Our Readers Write

A Problem of Ethics

To The Editor:

IF ONLY ONE source of light is used for the illumination of a complex object, facets in shadow may appear fuzzy and obscure and may even remain unseen. Personal experience leads me to conclude that I, and some other teachers, service chiefs and hospital administrators have failed to view clearly all of the factors entering into the correct, fair operation of the National Intern Matching Program. The basic agreement, by all parties involved, that the plan and its mode of administration should under every circumstance insure the fairest and most advantageous treatment of the student-applicants may be erroneously interpreted. This has actually led to deviations from the letter of the agreement which would on the face of it appear to be allowable, indeed desirable, because they seem to (1) protect the interest of individual student-applicants; (2) meet the desires of the hospitals and (3) avoid unnecessary multiple choices by students and hospitals

with attending delay and administrative expense.

A chief of service of a university hospital with 10 straight medical internships agrees informally to accept five student-applicants well known to him as superior and altogether desirable, and these applicants agree to select the university hospital internships as first choice. At first glance this informal arrangement seems fair and sensible because it substitutes certainty for uncertainty in relation to five of 10 positions, and this to the satisfaction of both parties concerned, and obviating correspondence and delay. What has been put out of mind or overlooked by many who have engaged in this practice, including the undersigned, is that the student and the hospital are thus tempted to exchange actual preferment of choice for certainty and security. This interferes with the operation of the plan under a system of free and unprejudiced judgments. The student and the hospital may actually settle for considerably less than free choice in order to conclude

the matter. Moreover, every position thus "exteriorized" from the workings of the plan invalidates the figures submitted by the hospital and used by students in making their selection. In the case cited above, instead of 10 internships in medicine the university hospital actually is offering for the matching plan only five and an applicant's chance of being selected in the matching program to fill one of them is reduced without his knowledge by 50 per cent in terms of available vacancies.

What seemed to have been clear

at the very beginning to those evolving the program should be clear now to all involved in the difficult matter of implementing it: it must be administered according to the letter of the agreement (which all of us have not done) if we are to avoid violation of the spirit of the agreement (to which, I believe, all of us subscribe). When the matter is viewed in this light, the ethical significance of the practice cited becomes apparent.—
HUGH J. MORGAN, *professor and head of the department of medicine, Vanderbilt University School of Medicine.*

NEWS DIGEST

Executive Council Meeting

Plans for establishing a permanent central office in the near future for the Association of American Medical Colleges were discussed at the meeting of the Executive Council, June 18-19, at the Palmer House, Chicago. An ad hoc committee, consisting of John M. Stalnaker, chairman, Dr. Joseph C. Hinsey and Dr. Dean F. Smiley, was appointed to draw up a report and make recommendations on housing arrangements to the Council.

The Association's budget for the new fiscal year—July 1, 1954-June 30, 1955—was approved as follows:

INCOME

Unrestricted income to AAMC.....	\$112,500
Earned income to sections.....	37,000
Grant income to sections.....	140,000*
Total	\$289,500

*There are also two additional grants of \$25,000 each, both for the Teaching Institute, one from the Heart Institute, the other from the Commonwealth Fund.

EXPENSE

Secretary's office	\$ 75,130
Journal & Publications.....	74,875
MAVI	18,000
Committee on Teaching Institutes & Special Studies	120,000
Total	\$288,005

Internships: The following recommendation of a joint committee, which was appointed as a subcommittee of the Association's Committee on Internships and Residencies, was presented by Dr. F. J. Mullin, NIMP chairman, and was approved after some revision: "The need for filing duplicate application forms as a national procedure for internship appointment, one to be sent to the hospital and one to be given to the dean

of the medical school by each student, no longer exists. In those medical schools which require that applications be forwarded through the office of the dean a duplicate application form, so marked, should be sent by the student directly to the hospital at the time he leaves his official form with the dean for transmission to the hospital from the school. In those medical schools which do not require that the application be forwarded through the office of the dean, the medical student should send his application for internship directly to the hospital."

The appointment of representatives to a joint committee, with the American Medical Association and the American Hospital Association, to consider changing the traditional dates for the beginning of internships and the beginning of residencies was confirmed by the Council. AAMC members of the committee are Dr. Mullin, Mr. Stalnaker and Dr. Howard Armstrong.

A request by the Student American Medical Association for membership in NIMP was reported by Dr. Mullin and approved by the Council.

Other Actions: In other actions, Council members:

1. Approved plans for the 65th Annual Meeting, to be held October 18-20, at the French Lick Springs Hotel, French Lick, Ind.

Plans for the 1954 Teaching Institute on Pathology, Microbiology, Immunology and Genetics were discussed by the Council. Dr. George Packer Berry, chairman of the Committee on Teaching Institutes and Special Studies, reported that 12 In-

stitute committee meetings have been held, the questionnaire has been distributed and much preliminary planning has been completed. The Institute, second in the Association's planned series of Teaching Institutes, will be held at French Lick October 10-15, immediately preceding the Association's 65th Annual Meeting.

2. Voted full institutional membership to the University of Puerto Rico, and heard reports on the possible development of new medical schools in Ohio, Connecticut and New Jersey.

3. Approved a school visitation and consultation schedule for 1954-55 in cooperation with the Council on Medical Education and Hospitals of the AMA. Carrying out of this schedule will leave only three medical schools in the U. S. that have not been visited within the past five years.

4. Approved plans for cooperation with certain of the regional accrediting associations in university visitations.

5. Instructed Dr. Smiley to telegraph Dr. Frank Berry, U. S. Department of Defense, to inform him that the Council is deeply concerned over the unfavorable attitude of the department toward continuation of the MEND program in the nation's medical schools. The Council has gone on record as favoring extension of this program to all medical schools that desire it.

"Health Career Horizons"

The National Health Council, with the support of the Equitable Life Assurance Society of the United States, has announced a nationwide project, to be known as "Operation Health Career Horizons." The plan is aimed at increasing interest at the high school level in careers in the health field.

Three publications, a guidebook for teachers and counselors, a personal-approach leaflet for the students and their parents and a series

of health horizon posters, will be distributed to the nation's 26,000 high schools and many junior colleges. The council expects to distribute the material before the end of the year.

ACPRA Meeting

The 1954 National Convention of the American College Public Relations Association was held at the Hotel Roosevelt, New York, on June 20-24. Its theme was "Advancing Man's Right to Knowledge."

Obstetrics Congress

Approximately 2,000 medical men from throughout the world met in Geneva, Switzerland, last month for the International Congress of Obstetrics and Gynecology. Dr. Howard J. Tatum and Dr. Milton L. McCall, of Louisiana State University, gave special reports on toxemias of pregnancy. They were among seven United States research men invited to speak.

Film Series

A new motion picture series on medical information is being prepared by Chas. Pfizer & Co., Inc. The films, to be produced in the Western Hemisphere, Europe and the Far East, will feature specialists demonstrating medical and surgical techniques. They will be available in English, Spanish, German and French.

The first of the series, a 12-minute short in color entitled "An Effective Burn Treatment," will show plastic surgery being performed on the hands and arms of a Mexican pilot who had been severely burned in a plane crash. Fred J. Schaefer of Film House, New York City, is producing the series.

Infantile Paralysis Grant

The National Foundation for Infantile Paralysis has awarded a \$198,495 research grant to the University of Pennsylvania for a five-year study of viruses that linger in body cells without causing damage

to the host cell. Dr. Geoffrey W. Rake, research professor of microbiology in medicine in the school of medicine and the school of veterinary medicine, will direct the project.

Dr. Sanger Honored

Dr. William T. Sanger has been named president emeritus of the National Society for Crippled Children and Adults. He is the immediate past president of the society, and for 28 years has been president of the Medical College of Virginia. Dr. Sanger was associated with the founding of the Baruch Center of Physical Medicine and Rehabilitation at the college.

Heart Research Awards

The American Heart Association and its affiliates have jointly bestowed 169 awards totaling \$953,370.71 to scientists engaged in research in heart and blood vessel diseases. This represents an increase of approximately \$150,000 over the sum allotted last year. In the six years since the American Heart Association became a voluntary health agency, it has provided nearly \$8 million in support of research.

Urological Awards

A program of clinical and laboratory research on disorders of the genitourinary system will be supported by seven grants-in-aid to universities and medical centers by the American Urological Research Foundation. The grants will total nearly \$35,000. The grants will go to doctors at Columbia, University of Pittsburgh, University of Rochester, University of Washington, U.C.L.A., Georgetown and Boston University.

Cancer Committee Director

The Tobacco Industry Research Committee has announced the appointment of Dr. Clarence Cook Little as director of its newly organized scientific research program.

Dr. Little is a former president of the American Association for Cancer Research, and has served as a mem-

ber of the National Advisory Cancer Council. He is also a former president of the University of Maine and the University of Michigan. At the present time he is the director of the Roscoe B. Jackson Memorial Laboratory at Bar Harbor, Maine.

Vitamin Foundation Grants

Eleven new grants to universities and medical centers have been announced by the National Vitamin Foundation. The grants, totaling \$55,085, will support a program of clinical and laboratory research in the fields of vitamins and nutrition.

Urology Essay Award

The American Urological Association has announced its annual award of \$1,000 (first prize \$500, second prize \$300 and third prize \$200) for essays on the result of clinical or laboratory research in urology. Competition is limited to urologists who have been graduated not more than 10 years, and to men in training to become urologists. Further information may be secured from Dr. William P. Didusch, Executive Secretary, American Urological Association, 1120 N. Charles St., Baltimore, Md.

Runyon Fund Grants

The Damon Runyon Memorial Fund awarded \$143,100 in June for research grants and fellowships. The total allocations of the fund now amount to \$8,037,718.

The Sloan-Kettering Institute received two awards for \$25,000 and \$11,000 respectively. Dr. Alice E. Moore and Dr. Helene W. Toolan will continue their research in preclinical studies of viruses as antineoplastic agents, and Dr. C. P. Rhoads, Dr. Rulon W. Rawson and Dr. Joseph E. Rall will carry on their project on serum iodine and serum protein in relation to thyroid function and treatment with radio-iodine.

Columbia University College of Physicians and Surgeons moves into its third year with an award of \$23,900 to further the study of cyto-

chemistry and biochemistry of differentiation in human neoplastic disease, under the direction of Dr. Howard C. Taylor and Dr. Seymour Lieberman.

Bellevue Medical Center of New York University received an additional \$11,500 for their current investigation of the chemical nature of environmental carcinogens, directed by Dr. Norton Nelson and Dr. William E. Smith.

Other institutions who received Runyon fund grants are the Polytechnic Institute, Massachusetts Institute of Technology, Tufts College,

the University of Colorado, the Cancer Institute and the University of Louisville.

Dr. Rourke Resigns

Dr. Anthony J. J. Rourke has announced his resignation as executive director of the Hospital Council of Greater New York. Dr. Rourke will spend his entire time consulting on a private basis in hospital administration, medical school administration, hospital construction and medical school construction.

College Briefs

Albany

Dr. WILLIAM C. VAN OST, a 1954 graduate, has been awarded an alumni exchange scholarship to intern at the University of Sheffield and the Royal Hospital in Sheffield, England, during the next academic year.

The class of 1929 recently presented the medical college with a gift of \$10,000.

Buffalo

The annual Samuel P. Capen alumni award has been presented to Dr. CHARLES GORDON HEYD for outstanding service to the university. Dr. Heyd is the founder of the New York City Area Alumni Club of the university, and professor of surgery at the New York Post-Graduate Medical School.

California

Dr. FRANCIS SCOTT SMYTH has resigned as dean of the school of medicine at San Francisco, effective July 1. He will continue as professor of pediatrics. Dr. Smyth will also continue his duties on the Board of Foreign Scholarships, the Committee on International Relations of the

Association of American Medical Colleges and as an editor of the *Journal of Diseases of Children*.

Chicago Medical

Dr. SIDNEY O. LEVINSON was posthumously awarded the honorary degree of doctor of science at the commencement exercises in June. He had been executive director of the Michael Reese Research Foundation.

Georgia

Dr. H. D. WYCOFF, assistant professor of oncology, has been awarded a research grant from the Public Health Service. The grant will enable Dr. Wycoff to further his study of the Schwartzman phenomenon in tumors.

Dr. WEBSTER A. SHERRER, a resident in pathology, has received a grant from the Damon Runyon Memorial Fund for a study of the synthesis of some phosphorus fractions in the particulate matter of normal and hepatoma-bearing rats.

Harvard

At the commencement exercises marking the conclusion of Harvard's 318th year, Dr. GEORGE PACKER BERRY, dean of the medical school,

was awarded the honorary degree of doctor of sciences.

Dr. ERIC LINDEMANN has been appointed professor of psychiatry and psychiatrist-in-chief at Massachusetts General Hospital. Dr. RAYMOND DELACY ADAMS has been named Bulard professor of neuropathology. He will continue as chief of the neurological service of the hospital.

Illinois

THOMAS S. JONES has retired after 41 years as a faculty member of the Chicago Professional Colleges. He had been professor and head of the department of medical and dental illustration since 1925. He will continue to serve as advisor to the Medical Audio-Visual Institute of the Association of American Medical Colleges.

Dr. ALBERT BACHEM, professor of biophysics in the department of physiology, will retire from his teaching and research activities on August 31. He has been a faculty member for 30 years.

Dr. FREMONT A. CHANDLER, head of the department of orthopedics, toured South American hospitals, clinics and medical centers recently, and presented papers in Brazil, Argentina and Peru.

After 28 years of service as head of the department of obstetrics and gynecology, Dr. FREDERICK H. FALLS will retire from teaching to devote himself to private practice.

Louisiana

Dr. ERNEST BUEDING has been appointed professor and head of the department of pathology. He has been on the faculty of Western Reserve University since 1944.

Dr. WILLIAM W. FRYE, dean of the school of medicine, has been appointed deputy director of the Commission on Enteric Infections of the Armed Forces Epidemiological Board, Office of the Surgeon General, Department of the Army.

The PETER GRAFFAGNINO lecture-ship, named after the first Louisiana State University professor in that

department, has been established in the department of obstetrics and gynecology. The first annual lecture will be given in October 1954 by Dr. EDWARD A. SCHUMANN of Philadelphia.

Louisville

Dr. ALEX J. STEIGMAN, professor of child health, has been appointed chairman of the department of pediatrics at the school of medicine, where he has taught for the past four years. In addition to serving as chief of pediatrics of the Louisville General Hospital, Dr. Steigman will act as physician-in-chief to the Children's Hospital.

Medical Evangelists

The college will celebrate its 50th anniversary in 1955. The board of trustees has appointed a committee of 10 to plan and direct the year-long celebration. Dr. W. F. NONWOOD, vice president, was named chairman.

Medically important arthropods are being maintained in live colonies for the study of disease transmission, chemotherapeutics and insecticides in an insectary developed by the department of entomology of the school of tropical and preventive medicine. Plans call for the insectary to be developed as a center from which live insects of medical and veterinary importance will be available for research personnel.

The building committee of the college has been authorized to proceed with drafting of plans for a \$300,000 professional office building to be located on the Los Angeles campus.

State U. of N. Y.

The new executive dean for medical education at the university is Dr. JEAN A. CURRAN. Dr. Curran has been dean of the college of medicine in Brooklyn and its predecessor, the Long Island College of Medicine, for 17 years. He will serve both the university's medical centers at Brooklyn and Syracuse, and will continue as professor of the history of medicine at Brooklyn.

Northwestern

Ceremonies marked the laying of the cornerstone of the new Morton Medical Research building at the medical center. The building is scheduled for completion in May 1955. It is financed by a \$2 million bequest to the university by Mrs. MARGARET GRAY MORTON.

Puerto Rico

The annual commencement exercises of the university were highlighted by the conferring of M.D. degrees on the school of medicine's first graduating class, which was composed of 37 men and eight women. One half of the graduates were selected under the National Intern Matching Program for internship in hospitals in the continental United States and the remainder will intern in Puerto Rico.

Tennessee

The Atomic Energy Commission has awarded \$10,843 to Dr. LESTER VAN MIDDLESWORTH, associate professor of physiology, for a study of iodine metabolism in human beings and experimental animals, with special reference to goiters.

Texas, Galveston

Dr. VERNIE A. STEMBRIDGE, associate professor of pathology, has been appointed coordinator of cancer studies at the medical branch.

A JAMES W. McLAUGHLIN fellowship fund has been established in honor of the late professor of internal medicine. Funds are available to support predoctoral and postdoctoral fellowships as well as senior and faculty fellowships in the investigation of infection and immunity. The fellowships will be made available for one year, with opportunities for renewal in some instances.

Tulane

A laboratory and clinic for the study and treatment of migraine have been established in the school of

medicine by LALLAGE FEAZEL of Monroe, La.

A gift of \$20,000 to put the laboratory into operation was presented by Miss Feazel and her father, former Sen. W. C. Feazel. The laboratory will be included in the cardiovascular laboratories to be situated in the new addition to the Hutchinson memorial medical building, now under construction.

The laboratories will be under the direction of Dr. GEORGE BURCH, Henderson professor of medicine and chairman of the department of medicine.

Woman's Medical

A gift of \$61,000 has been announced by the national board of the college, of which \$55,000 was designated to establish the LOIS MATTOX MILLER fellowship fund for preventive medicine.

Yale

Dr. WILLIAM W. L. GLENN, associate professor of surgery in charge of the section of cardiovascular surgery and Dr. HERBERT S. HARNED JR., assistant professor of pediatrics, have been named to fill the faculty posts supported by a \$250,000 grant from the Victoria Fund.

The grant was made "in support of the teaching, research and medical care programs in the field of cardiovascular diseases," and will pay \$50,000 annually for a period of five years.

The school of medicine will receive from the Victoria Fund a gift of \$50,000 annually over a period of five years in support of teaching, research and patient care in the field of cardiovascular surgery. Dr. WILLIAM W. L. GLENN, associate professor of surgery in charge of the section of cardiovascular surgery and Dr. HERBERT S. HARNED JR., assistant professor of pediatrics, will fill the faculty posts supported by the gift.

Two new fellowships in biochemistry have been established. The Lafayette B. Mendel fellowship in

biochemistry is for exceptionally promising first-year graduate students. The first award will be made this spring. In addition, the Lalor fellowship in biochemistry will be awarded to predoctoral graduate students.

Dr. IRA V. HISCOCK, professor of public health at the school of medicine, has received the 1954 Shattuck award for outstanding and meritorious contributions to the field of public

health. The award was established by the Massachusetts Public Health Association in 1950. Dr. Hiscock was recently elected president of the Association of Schools of Public Health of the United States and Canada.

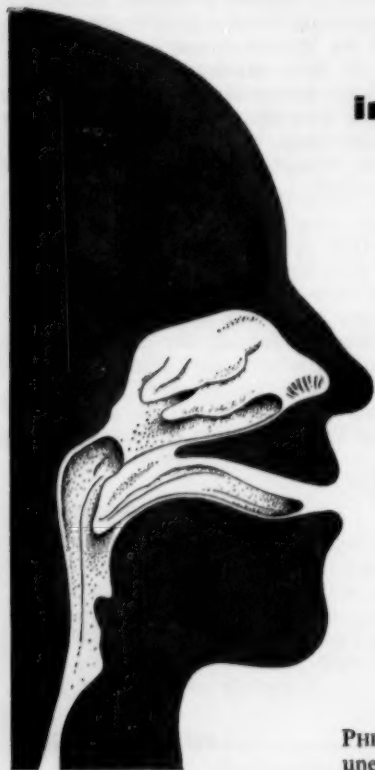
Dr. WILLARD ARTHUR KREHL, associate professor of nutrition, has been awarded the Russell M. Wilder fellowship by the National Vitamin Foundation. The fellowship, for \$15,000, is for a three-year period.

NEW FELLOWSHIPS BOOKLET

The fourth edition of "Fellowships, Funds and Prizes Available for Graduate Medical Work in the United States and Canada" was published by the Association of American Medical Colleges last month. The 100-page booklet is a compilation of sources of assistance for graduate medical work, listed alphabetically according to the institution, organization or fund-allocating agency.

Three indexes are included. One lists the institutions and organizations offering research and other opportunities for graduates in medicine; the second lists by name the fellowships, prizes and scholarships; the other is a list of subjects and fields in which opportunities are offered. The booklet does not include scholarships for undergraduate medical work nor for internships or residencies. Information concerning undergraduate medical scholarships may be found in the catalogues of the various medical schools and in the booklet "Admission Requirements of American Medical Colleges," an AAMC publication.

Copies of the "Fellowships, Funds and Prizes" booklet are available for \$1.50 each from the Association of American Medical Colleges, 185 N. Wabash Ave., Chicago 1, Ill.



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1. Silbert, N. E.: *Ann. Allergy* 10:328 (May-June) 1952
2. Peshkin, M. M., and others: *Ann. Allergy* 9:727 (Nov.-Dec.) 1951

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Audiovisual News

Audiovisual Aids for Disaster and Military Medicine in the Medical Schools

David S. Ruhe and George V. Byfield

MEDICAL EDUCATION for National Defense (MEND) pilot programs are afoot in five medical schools across the country.* Because of the abandonment of medical ROTC units, the pilot efforts have been devoted to exploration of the best methods for incorporating into the crowded medical curriculum the vital material of military and disaster medicine so that doctors will be graduated ready for service or for national or local emergencies.

Certain of the pilot programs early discovered that their areas of activity were richly supplied with slides, filmstrips and motion pictures, thanks to the prior interests of the Armed Forces, the federal Civil Defense Administration, the American Red Cross and many others. Methodical survey and evaluative review of the available audiovisual materials appeared to be pertinent inasmuch as a relatively large proportion of military and disaster medicine lies on the fringe of what is presently taught to future American general practitioners. Such review was conceived to be of probable important assistance to the responsible faculty personnel when and if MEND programs become universal and, indeed, valuable in its own right.

The propinquity of the University of Illinois pilot programs with the

Medical Audio-Visual Institute's regular film reviewing activities suggested that collaboration might be profitable. The Institute's previous film evaluation had in many cases already cut sharply into the areas of MEND interest. For one example, "Films in Atomic Medicine" (1951)¹ had surveyed films then available for this segment of disaster instruction. Many films in traumatic medicine,² infectious (and exotic) disease, psychiatry³ et al. had been appraised, and reviews either had been published or could be extracted readily from the Institute's unpublished work. This study of 96 films and filmstrips has derived from combined efforts to assemble evaluative information on a wide range of audiovisual materials of possible benefit to all those concerned with teaching MEND material in the medical schools.

For many months brief reviews deriving from or relation to the study have appeared in the Journal of MEDICAL EDUCATION. In more recent issues they have been printed *en bloc*. All Journal reviews are indicated by an asterisk with each film title. Other film titles are numbered according to the reference below. Since most of the materials appraised were motion pictures, we have designated slide films by the initials SF. Many of the films have been reviewed in the J.A.M.A.⁴ and additional judgments of professional value are elsewhere available.

General Orientation to War and Disaster Medicine: Unfortunately, there is a growing film literature on war and disaster. World War II, the

*Cornell, Buffalo, Vanderbilt, California (San Francisco), Illinois.

Dr. Ruhe is head of the department of audiovisual education at Kansas University Medical Center and former director of the Medical Audio-Visual Institute of the Association of American Medical Colleges. Dr. Byfield is clinical assistant professor of medicine and coordinator of the MEND program at the University of Illinois College of Medicine.

atomic bomb test blasts and natural disasters have been recorded and synthesized in film. For impressing students with the confusion, complications and grave medical handicaps of military and civil disaster, a number of films are available. All must be handled with proper care in the medical student setting. Five which pose something of the horror and incredibility of disaster are:

"A Tale of Two Cities,"¹ "Atomic Medical Cases: Japan World War II,"¹ "Target U.S.A.,"² "Disaster Control,"² "Earthquake in Ecuador,"² "Disaster on Main Street,"² "And a Voice Shall Be Heard,"² and "Survival Under Atomic Attack."²

First Aid and Emergency Medicine: Many agencies have prepared film or filmstrip series on first aid. The U. S. Army, Navy, St. John's Ambulance Corps of Canada (McGraw-Hill Book Company in the U. S.), Red Cross and many independent agencies have produced materials for first aid trainees. This survey excluded most of the lengthy series above except where there seemed to be a clear indication of likelihood of use in medical schools.

Four films on artificial respiration were seen. The joint Army-Navy-Air Force-produced film, "Artificial Respiration. The Back Pressure Arm Lift Method," appeared to have most application to professional training.

Potential medical student teaching values were seen in: "First Aid in the Prevention of Shock,"² "First Aid in Major Wounds, Fractures and Burns,"² "Checking for Injuries,"² "First Aid for Burns in Civil Defense,"² and "Sucking Wounds of the Chest."²

Traumatic Medicine in MEND Applications: The professional medical films dealing with emergency surgery and trauma of all types are far too abundant to lend themselves to complete survey. Only those with a more or less clear potential application to MEND needs were reviewed. Anes-

thesia, surgical emergencies, blood and blood substitutes, shock, hemorrhage, chemical and physical traumas have been included here. There are many omissions, notably materials restricted in their use by the Armed Forces. Of possible value are:

"Clinical Shock,"² "Vascular Injuries,"² "Venepuncture,"² "Emergency Blood Collection and Administration,"² "Early Care of Plastic Surgery Cases. Wounds of the Hand,"² "Modern Techniques of Collecting Blood Samples,"² "Soft Tissue Wounds,"² "The Preparation and Use of Human Plasma,"² "Disaster Anesthesia. Open Drop Ether,"² "Principles of Fracture Reduction"² and "Trench Foot."²

The four-part Army filmstrip, "Chemical Warfare Injuries. Prophylaxis and Treatment,"² contains much unique and valuable material, but with limitations as indicated in the review. Many useful individual frames, potentially usable as slides, are found within the total content. The Chemical Medical Center's "Wound Ballistics" (Dr. Carl Herget) was restricted but contained revealing footage on bullet injuries.

Psychiatry: Panic, hysteria, acute psychosis and combat fatigue are the psychiatric problems of MEND interest. Panic is represented in fragmentary fashion in "Target U.S.A." and elsewhere in general orientation films, but nowhere as a specific medical entity. The Army and Navy have been greatly concerned with psychiatric casualties in troops, and have prepared films for doctors and for the patients themselves. Useful films include:

"Let There Be Light,"³ "Shades of Gray"³ and "Psychosomatic Disorders."³

Atomic Medicine: The radiation injuries of Hiroshima, Nagasaki and of numberless animals have created a new medical lore of the atomic age. Apart from generalized orientational films concerning the many kinds of atomic blast trauma, only two films appear to be useful: "Medical Effects of the Atomic Bomb."

²This film and other films marked with an asterisk (*) have been reviewed in the Journal of MEDICAL EDUCATION.

Infectious Diseases Including Biological Warfare: Three orders of films on infectious diseases have importance from the MEND program standpoint: those concerned directly with bacterial warfare, those concerned with military medicine (largely exotic diseases), and those pertaining to traditional epidemic diseases which might become the sequelae of disaster.

For teaching BW, only indirect or lay material is available. If adequate material exists, it is carefully restricted by the military medical authorities.

Three films appear to be useful for related teaching: "The Sneeze,"* "Infectious Hazards of Bacteriological Techniques,"** and "What You Should Know About Biological Warfare."*

In the area of exotic or tropical diseases the acceptable film literature is very rich. The recent listing of the Society of American Parasitologists includes a large number of useful titles.⁶ Very many films and filmstrips useful in part or in whole, derive from the war and postwar efforts of the Army, Navy and Public Health Service. Films considered potentially useful in teaching tropical and exotic diseases are these:

General: "The Eternal Fight": "Habits and Characteristics of the Norway Rat."*

VIRUSES AND RICKETTSIAE: "Typhus in Naples,"* "Arthropod-Borne Encephalitides,"* "Breakbone Fever—Bengue,"* "Smallpox and Vaccination" and "Sandfly Control."*

BACTERIA: "Cholera Can Be Conquered,"* and "Plague Control."*

PROTOZOA: "Adventure in Sardinia,"* "Clinical Malaria,"* "Intra-Mosquito Phases of *P. falciparum*" (CDC), "Movements of *E. histolytica*" (CDC), "The Life Cycle of *Endamoeba histolytica*", "African Trypanosomiasis" and "Yaws."*

HELMINTHS AND ECTOPARASITES:

*The Communicable Diseases Center, Public Health Service, has released six films under the series title "Infectious Hazards of Bacteriological Techniques," not reviewed here.

"Scabies"* and "The Scabies Mite,"* "Schistosomiasis,"* "Manson's Blood Fluke,"* "The Human Blood Fluke,"* "Onchocerciasis, the Blinding Filariasis"* and "Control of Filariasis in Tahiti."*

Medical Administration in War and Disaster: The handling of mass casualties in emergency situations is a familiar problem to military physicians. "Transportation of Casualties,"* presents the range of possible handling of the injured, but requires suitable discussonal handling. The three Army-produced filmographs on "Medical Service of the Infantry Division" were too specifically of military design and, in addition, were restricted in use.

Slides, Booklets, Exhibits et al.: It was beyond the function of the study to cover exhaustively all audiovisual aids. However, certain items came into view as incidental findings, and are worthy of report because they augment the other AV materials here mentioned.

SLIDES: The Clay-Adams Company Medichrome slide collection⁶ contains a number of miscellaneous slides concerning trauma and bacteria potentially concerned with BW, plus many in the exotic diseases. The Ciba Company's illustrations by Dr. Frank Netter⁷,* contain material on traumatic medicine; a color slide set photographed from the plates is available from Ciba, but irregular color quality suggests that more useful slides may rather be self-made from the books despite their graininess.

EXHIBIT AND DEMONSTRATION MATERIAL: The U. S. Navy has prepared "The Dying Manikin," a plastic, rubber and cloth device which permits semi-realistic student participational experience with fractures, lacerations, etc. After mass production, these manikins would appear to offer real help in training for trauma management.

The sharing of MEND exhibits of simple type through some shipping plan is to be explored by the University of Illinois. It is conceived that circuits of exhibits deriving

from schools, the Armed Forces, the Red Cross and FCDA would be helpful adjuncts to medical school teaching.

BOOKLETS: Profusely illustrated booklets suggest themselves not only as direct teaching aids, but also might provide notebook references and possible posters in the event of actual disaster. Abbott Laboratories' "Artificial Respiration"⁹ is an excellent case in point. Appropriate pharmaceutical houses might well find it to their interest to prepare and widely distribute booklets on key MEND topics.

Summary

The Medical Education for National Defense pilot programs have found audiovisual aids useful in their evolution to date. The University of Illinois with the Medical Audio-Visual Institute of the Association of American Medical Colleges has surveyed a portion of the films, filmstrips and other AV materials which appeared to be potentially of value in integrated medical school MEND teaching. Suggestions for utilization have been made and a working film-title bibliography has been supplied. Much that is useful is available, as is evidenced by the reviews published in the *Journal of MEDICAL EDUCATION*. It remains for medical faculties to utilize effectively the rich visual teaching literature of military and disaster medicine.

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2. RUHE, D. S., NICHTEHAUSER, A., LEVERIDGE, L. L., WEINTRAUB, H. J., LUGER, N. M.: "Films in the Cardiovascular Diseases (I)," American Heart Association, New York, 1953.
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4. CREER, RALPH P.: "Reviews of Medical Motion Pictures," *J.A.M.A.* 1946-1954 (collected reprints and bibliography for these films are available).
5. "Visual Aids to Instruction in Parasitology," Communicable Disease Center, Public Health Service, Training Branch, Atlanta, Ga., and Committee on Visual Instruction of the American Society of Parasitologists, September 1953.
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7. NETTER, FRANK H.: "Ciba Collection of Medical Illustrations," Ciba Pharmaceutical Products, Summit, N. J., 1948.
8. *Ibid.*
9. GORDON, ARCHER S.: "What's New #165," Abbott Laboratories, North Chicago, Ill., February 1952.

FILM BIBLIOGRAPHY

Traumatic Medicine in MEND Applications (including CW)

"General Effects of Health on Man"* (Army); "General Effects of Cold on Man"* (Army); "Trench Foot" (Army); "Use of Whole Blood, Plasma and Concentrated Serum Albumin with Special Reference to Shock"* (Navy); "Neurosurgery. Management of Spinal Cord Injuries" (Navy); "Eye Surgery—Field Management of Eye Injuries" (Navy).

Psychiatry

"Introduction to Combat Fatigue" (Navy); "Irritability" (Navy); "Insomnia" (Navy); "Assignment Home" (Navy).

Atomic Medicine

"Our Cities Must Fight" (ECDA—Archer); "Atomic Alert" (Encyclopedia Britannica); "You and the Atom Bomb" (F.S.) (Visual Sciences); "Atomic Survival" (F.S.) (Still-film—Burbank CDA).

Infectious Diseases (including BW)

"Tsutsugamushi Prevention" (Navy); "Control of Mosquito-Borne Diseases" (Army); "Smallpox" (Nigerian Film Unit); "Control of Louse-Borne Diseases" (Army); "Biological Warfare"

Medical Administration

"Evacuation of Casualties" (Army).

Miscellaneous

"This Is Civil Defense" (FCDA); "Shock Troops for Defense" (Brandon); "Fire Fighting for Householders" (Teletran—FCDA); "Fire Preparedness" (McGraw-Hill); "Fire" (F.S.) (Stillfilm—Burbank); "Self-Preservation in an Atomic Attack" (Armed Forces Special Weapons); "Medical Effects of Atomic Radiation" (Armed Forces Special Weapons); "Atomic Radiation" (Encyclopedia Britannica Films).

"Gram's Stain" Rated

Poor 6, Fair 23, Good 45, Excellent 17, No Indication 6.

The film "Gram's Stain" (See Journal of MEDICAL EDUCATION review, October 1953) was rated in the above manner by the first 97 appraisal forms received from the medical colleges on the preview circuits. The film was viewed by a total of 402 faculty members and 1,156 students. It was thought appropriate for the following audiences, in order of frequency:

Medical students	69
Technicians	30
Others	39
No indication	6

The film was considered to be best suited for the following purposes:

To provide an introduction	65
To be presented as an integral part of instruction	25
To provide a preview	13

The following comments are representative views of those who rated the film good or excellent: "The subject matter of the film is presented in clear, logical order. The commentary is adequate. Details of the technique presented are accurate and not so numerous as to be cumbersome and confusing. Photography is excellent," and "I would use such a film instead of my verbal description of the procedure, pass out mimeographed direction sheets outlining the steps and feel that the class has all the necessary information for properly performing the Gram's stain."

Those previewers more critical of the film thought that it was "really not necessary in view of the subject." One individual stated that "actual demonstration would probably be just as satisfactory and allow explanation of basic processes."

Appraisers were asked if they thought this film should be bought or rented. Twenty-one indicated that this film should be part of the college library. The same number thought

this film one which they would want to rent or borrow from time to time.

Distribution: Sturgis-Grant Production, Inc., 314 East 46th St., New York 17, N. Y. Society of American Bacteriologists, Dr. Harry E. Morton, chairman, University of Pennsylvania, School of Medicine, Philadelphia 4, Pa. Loan.

Film Study Completed

A report on *Films in the Cardiovascular Diseases, Part II: Survey Conclusion* by David S. Ruhe, M. D. and Adolf Nichtenhauser, M. D., for the Medical Audio-Visual Institute is now complete and is available in each medical school in bound mimeographed form. It contains 39 film reviews grouped under the following major headings: (A) Heart and Great Vessels, (B) Peripheral Blood Vessels and (C) Miscellaneous Subjects.

This report concludes the three year study supported by the National Heart Institute, Public Health Service. Part I of the report containing reviews and review summaries of 62 films was published by the American Heart Association and the Association of American Medical Colleges in 1953 and is available from the American Heart Association (paper cover \$1.50, cloth cover \$2). In reviewing this earlier volume, *Science and Film** says, "Perhaps the most urgent requirement of the film user is a series of appraisals from which he can determine accurately the value of particular films for teaching purposes. Nowhere has the problem been more actively investigated. . ."

British Medicine Talk

A discussion on "Some Aspects of British Medicine" was presented recently in Chicago by Sir Russell and Lady Brain during their visit as guests of the American College of Physicians. Sir Russell Brain is president of the Royal College of Physicians. A tape recording of the talk was made and is available upon request from the British Information Services, 720 N. Michigan Ave., Chicago 11, Ill.

*See *Science and Film*, London Vol. 3, March 1954, P. 39.



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Book Reviews

A Manual of Otolaryngology, 4th Edition

Howard Charles Ballenger, M.D. and John J. Ballenger, M.D. Lea & Febiger, Philadelphia, 1954. 365 pp. with index. \$6.

This fourth edition, published 1954, has many changes. As the authors indicate, they have rewritten the section on the pathology of the nose, the Eustachian tube, hearing and the vestibular labyrinth. Other important additions have been made on allergy, malignant neoplasms of the larynx and Meniere's disease. The new concepts on many pathological conditions have been added. The rewritten section on the indications and treatment for tracheotomy is very concise.

One agrees with the authors on the concept of the book's preparation for undergraduate teaching of medical students and general physicians, but it is also a book of ready reference for its special field of medicine.

Being a book that emphasizes the anatomy, etiology, symptoms and diagnosis and includes generally accepted treatment, it is most adaptable as a teaching manual. It is well organized with 37 chapters, illustrated with 136 figures and three colored plates. Since in most medical schools, the time allotted for teaching otorhinolaryngology is so limited, the coverage of this book makes it very adaptable, as it covers its subject matter so adequately in 365 pages.

J. S. Bumgardner, Louisville

Dynamics of Virus and Rickettsial Infections

Edited by F. W. Hartman, F. L. Horsfall Jr., and J. G. Kidd. The Blakiston Company, New York, 1954. 461 pp. \$7.50.

This book embraces the papers and discussions of a three-day symposium held in October 1953 under the auspices of the Henry Ford Hospital. The 33 informal papers were divided into five major categories: mechanisms of virus and rickettsial infections, ecology and pathogenesis, mechanisms of immunity,

laboratory diagnosis and approaches to prophylaxis and therapy of virus and rickettsial infections. Seven general discussions are included.

The book should prove especially useful in indicating the multiplicity and individuality of viewpoints and approaches which each of the investigators brings to the virus field; this is especially true in the section on mechanisms of infection. Of especial interest is the discussion by Dr. Lennette on problems and limitations in providing diagnostic services in this field to the average physician which are encountered by a state public health laboratory and the contrasting picture by Dr. Syvertson of the opportunities available in a large medical center in which these highly specialized research procedures can be invaluable in the teaching of medicine.

The controversial issue of attenuated versus killed vaccines is well covered and Dr. Koprowski's presentation of his viewpoint has, as a by-product, inspired the reviewer to do some reading in A. P. Herbert's "Uncommon Law" (Methuen, London, 1936).

Elvin A. Kabat, Columbia

Histopathologic Technic and Practical Histochemistry

H. D. Little, M.D. The Blakiston Company, Philadelphia, 1954. 501 pp. with index. \$7.50.

This book, originally published in 1947 as "Histopathologic Technic," has been fully revised and expanded by 185 pages. Compiled as a laboratory reference it follows the outline of the original edition. Numerous references are conveniently included within the text. Portions devoted to the practical aspects of microscopy (including fluorescence and phase microscopy), equipment, fixation, sectioning and general staining procedures are presented with clarity and attention to detail.

The author's comments concerning results, limitations and variations of selected special staining techniques reflect

his wide experience. Notable additions have been made as regards amino acid reactions, enzymatic digestion tests, blockade methods, the demonstration of localizable enzymes and oxidation Schiff techniques.

As the impetus in pathology shifts from a purely morphologic concept to one of pathologic physiology, histochemistry with its integration of structure and chemical constitution becomes of obvious importance in affording insight into the essential nature of disease processes. With histochemical techniques finding rapidly increasing application in research pathology, histology and diagnostic histology, this volume should be a useful addition to the laboratory of those thus engaged.

R. B. Turner, Maryland

Congenital Heart Disease

Henry S. Kaplan, M.D. and Saul Joel Robinson, M.D. McGraw-Hill Book Co., Inc., New York, 1954. 117 pp. plus index. \$12.50.

For many years the diagnosis of a congenital cardiac abnormality was of academic interest only. However, due to rapid developments in the diagnosis and especially the treatment of congenital heart disease in recent years, an intelligent understanding of some of the fundamental problems of congenital heart disease is important for the present-day physician whether he be specialist or general practitioner.

The advances in the knowledge of this subject can be traced in a large part to the pathologic studies by Abbott and the clinical correlation by Taussig.

Considerable literature on the subject has developed so that a concise evaluation such as this small volume of 126 pages is most welcome. It is divided into two sections: orientation and atlas. Considerable emphasis is placed on clinical evaluation and a successful attempt has been made to place special examinations such as laboratory procedures and roentgen studies in their proper perspective. Certainly, many methods of evaluation are important and certainly it is well to remember that no one can provide complete and conclusive evidence regarding the nature of existing alterations in the cardiac structure. This certainly applies to roentgen study which, despite its shortcomings, is a very valuable adjunct in the study of cardiac lesions. The eight pages devoted to treatment are certainly

not adequate for other than a mere listing of fundamentals, but this chapter is probably adequate for the individual for whom this book is designed.

Section two, the atlas, comprises about one-half of the book and follows the orthodox classification of cyanotic and acyanotic congenital defects, the first part being further divided into 10 types and the second into eight.

Fifty-seven references are listed; certainly not a complete bibliography on the subject but well selected.

The book is carefully indexed, adequately illustrated and all in all is considered a worthwhile manual for pediatrician, internist, general practitioner, radiologist and for medical students.

James F. Kelly, Creighton

Books and Pamphlets Received

(As space permits, those with the greatest interest to our readers will be reviewed)

Antibodies and Embryos

W. F. Rogers Brambell, W. A. Hemmings and M. M. Henderson. John de Graff, Inc., New York, 1954. 87 pp. with index. \$2.25.

Isotopic Tracers

G. E. Francis, W. Mulligan and A. Wormald. John de Graff, Inc., New York, 1954. 265 pp. with index. \$7.

Fundamentals of Anesthesia, Third Edition

Prepared under the editorial direction of the Consultant Committee for Revision of Fundamentals of Anesthesia, a publication of the Council on Pharmacy and Chemistry of the American Medical Association. W. B. Saunders Co., Philadelphia, 1954. 268 pp. with index.

Beyond the Germ Theory

Iago Goldston, editor. Health Education Council, New York, 1954. 170 pp. with index. \$4.

The Microtome's Formulary and Guide

Peter Gray, Ph. D. The Blakiston Company, Inc. New York, 1954. 680 pp. with index.

Microbes and You

Stanley E. Wedberg, Ph.D. The Macmillan Company, New York, 1954. 416 pp. with references.

The Doctor Writes

S. O. Wulfe, editor. Grune & Stratton, New York, 1954. 175 pp.

Why We Became Doctors

Noah D. Fabricant, editor. Grune & Stratton, New York, 1954. 179 pp. \$3.75.

Abstracts and Excerpts

Berry, George Packer. **The Role of the Medical School in Industrial America.** Reprinted from "Industrial Medicine and Surgery," 23:6, 212-223, May 1954 by the National Fund for Medical Education.

The Apprenticeship Era

In 50 years the profoundly changing pattern of American life—in industry, in communication, in social consciousness and in practically every area of our culture—has thrown new and challenging opportunities before our medical schools.

It is these very medical schools that have helped so greatly to accelerate the changing patterns in our lives by playing a central role in the creation of the healthiest national community that the world has ever known.

Medicine and industry have grown side-by-side. Both have matured with the times, just as both have influenced these times. Industrial physicians are in an enviable position to appreciate the delicate process of action and interaction.

Fifty years ago no one could have predicted this interlocking role of medicine and industry in reshaping American life. Before the turn of the century many of the medical schools were such in name only. They were adhering to an apprentice system that had outlived its usefulness. In 1904 in the United States, 160 medical schools were training a student population of 26,000; today 80 medical schools have a student population that has only recently exceeded the 1904 figure.

The Scientific Era

Following the turn of the century, the scientific era in American medicine began to flourish, an era that has led to specialization with all its benefits and difficulties, an era, also, of increasing complexity and accordingly of unprecedented cost for medical education. Scientific principles have become the cornerstone of medical teaching.

The cost has run to many millions of dollars. Only by tolerating dangerously

low salaries for teachers, by foregoing badly needed repairs and improvements, by abandoning long-overdue expansion . . . have the medical schools kept going.

The Transition to Comprehensive Medicine

There are other important ingredients of the changing structure of medical education. Some far-sighted teachers are coming to realize that we are not as broadly scientific in the teaching of medicine as we have thought. Scientific medicine means the scientific evaluation of the patient in his ecological setting: physiological, psychological, sociological. The term for this is "comprehensive medicine."

The Modern Medical School

The goal is to teach the comprehensive nature of medicine itself, to equip the future physician to develop in whatever way he finds most stimulating. One of the most exciting aspects of medical education today is the willingness of medical schools to undertake educational experiments. However, new and substantial financial support is required. This support can no longer be secured from the present endowments of the schools—endowments must be greatly augmented—or from the grants that most schools are receiving annually for special investigations.

The Medical School and Industry

When speaking about the health of the nation we are speaking about industrial health, because industrial health is not a special kind of health, any more than industrial medicine is a special kind of medicine.

The best approach to solving the problems of financing can be found in explaining our problem to the American people. The public will not let us down.

White, Thomas Taylor. **European Medicine Today.** "Northwest Medicine," Vol. 53, No. 4, April 1954.

When I arrived in Europe for the first time, in July 1952, I had only the vaguest

For Consideration for Class and Reference Use

HUMAN BIOCHEMISTRY

In this new 1954 edition the author has attempted to keep sight of the vast new horizons in biochemistry. The first objective has of course been to eliminate any concepts which have changed or are of doubtful nature. More difficult has been the task of selecting from the almost limitless researches those advances which seem to be authenticated and at the same time of significant value to the student. The original purpose of the book—to create a useful, understandable, and compact volume—has been kept in mind constantly. Every chapter has been examined critically. Large areas have been completely rewritten, notably those dealing with blood coagulation, enzymes and coenzymes, physiological oxidations, cholesterol metabolism, urea formation, transmethylation, and the mechanism of insulin action. Among the new topics are the dextrans, triiodothyronine, glucagon, serotonin, the carbonic anhydrase inhibitors, blood iodine, lipoic acid, and the structure of insulin and of oxytocin. A section is devoted to the nomenclature of the steroids.

By ISRAEL S. KLEINER. 4th Edition. — pages, 92 illustrations, 5 color plates. Price, \$7.50.

LABORATORY INSTRUCTIONS IN BIOCHEMISTRY

Designed for use with "HUMAN BIOCHEMISTRY" this manual is adaptable to any text on biochemistry. The most noteworthy changes in this 1954 edition are the addition of experiments with ion exchange resins and paper chromatography, the phosphatase test for pasteurization, and the Somogyi-Nelson blood-sugar procedure. Both qualitative and quantitative directions have been made more explicit and some have been modified.

By ISRAEL S. KLEINER and LOUIS B. DOTTL. Fourth Edition. 290 pages. Price, \$3.50.

PHYSICAL DIAGNOSIS

The more one correlates the physical signs with findings shown by instruments of precision, the more independent is the doctor of refined diagnostic measures. Thus, in describing the signs which are valuable, Walker presents new and useful information on the everlasting challenge in medicine. Six specialists collaborated in sections in their respective fields—bringing to this edition greater practicality. Generally recognized as an important and effective text, this book is deserving of special consideration.

By HARRY WALKER. 461 pages, 126 illustrations. Price, \$8.00.

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ELECTROCARDIOGRAPHY

This "blackboard" EKG is designed especially for the student and general practitioner. It answers such specific questions as: "What does the tracing mean?" "What leads are necessary?" "How do I use the Electrocardiograph?" "How do I interpret the record?" Atlas in size (8½ x 11), convenient double-column pages, profusely illustrated, this new EKG is the simplest, easiest to understand thus far published.

By E. GREY DIMOND. 272 pages, 272 illustrations. Price, \$14.00.

LEGAL MEDICINE

For the first time, a comprehensive book on the relationship between medicine and the law is available in the American literature. The scope of the book is as expansive as the subject of Forensic Medicine—and will make an excellent text or reference guide. Beginning with a history of legal medicine it covers all the expected subjects—Toxicology, Legal Pathology, Forensic Thanatology, Paternity Proceedings and Blood Tests, the Law in Regard to Abortion, Legal Aspects of Neuro-pathology, Forensic Psychiatry, Poisoning, Cross Examination and the Medical Expert Witness, the Relationship of Trauma and Disease and Social Aspects of the Medico-Legal Autopsy. Among the unexpected coverage are chapters on Powder Burns, Hairs and Fibers, Dental Evidence in Identification and Criminology and Lie Detection.

Edited by R. B. H. GRADWOHL. St. Louis. 1093 pages, 222 illustrations. Price, \$20.00.

PHYSIOLOGY OF THE EYE

A dependable text and reference work revised and brought up to date. Here the author gives you the "why" and "how" of what he stresses, and discusses how the various portions of the eye function normally. In this revision a considerable amount of new material has been added—particularly in the sections on the cornea, aqueous humor, and vitreous. The chapter on visual acuity has been greatly enlarged. It now includes many practical features, such as physiological factors of importance in refraction, the Stiles-Crawford effect and the part it plays in accommodation.

By FRANCIS HEED ADLER. 2nd Edition. 734 pages, 329 illustrations, 3 in color. Price, \$13.00.

notions as to how medicine there compared with medicine in the United States. I wondered what was different in European medicine. How did the public react to physicians? What sort of people were these physicians? What type of training did they receive? How were their hospitals equipped?

To those of us from the Northwest the most striking feature of European medicine would be the sharply limited freedom of choice given the physician as to type and place of practice. By custom, general practices are handed down from generation to generation to whom-ever the physician wishes to sell or give them (this is said to be less true now than formerly).

In the specialties there are at present more people being trained in certain fields (particularly surgery) than there are positions to fill.

Medical education in Europe . . . starts earlier, lasts longer and assumes much more the aspect of apprenticeship than does our system. In general, a gymnasium or high school diploma is required for admission. (It might be added that a much smaller proportion of Europeans go to high school than is the case here, but on the other hand the high schools have, in general, a higher aca-

demic standing than is usual in the United States.

Departments in the medical schools tend to be more separate and unrelated to each other than they are here. This has the advantage of fostering more pure research, but the student suffers somewhat from lack of correlation between courses. Many students told me that they were left with only one department during their entire period of several months at the hospital. Another feature of departmental individuality has been a gradual lengthening of the medical school course.

Equipment is very similar to that found in this country, with some minor variations. The Halsted technique is not popular on the whole, among surgeons. For this reason clamps and forceps are larger and various types of coagulating apparatus are much in evidence.

It would be fair to say that our best medicine is on a par with the best in Europe, and that, perhaps, we have more of it. European leaders look to us for leadership in surgery, urology, anesthesia and antibiotic therapy. At the same time we must look to them for leadership in radiation therapy, some phases of x-ray diagnosis, disease of the skin and many other things.

The Personnel Exchange

Faculty Vacancies

• **PEDIATRICIAN:** Desired for half-time position as instructor for clinical clerkship program. Will assist in obtaining private practice opportunity for half-time not devoted to teaching. Address: V-17.

• **OPHTHALMOLOGIST:** Residency available in ophthalmology at Vanderbilt University School of Medicine. For details address Dr. Henry Carroll Smith, 630 Doctors Building, Nashville 3, Tenn.

• **OBSTETRIC—GYNECOLOGY:** Professor and chairman of combined department, now under part-time professor; university desires to establish full-time department. Well-trained academically oriented man of approximately 40 years of age desired. Address: V-18.

• **FELLOWSHIP—CHILD PSYCHIATRY:** Candidates must be M.D.'s with basic psychiatric or pediatric training. In addition to the clinical experience, the fellow in training will be encouraged to take certain academic courses which, if desired, can lead to acquisition of either a M.S. or Ph.D. degree. Write to Dr. Reynold A. Jensen, office of the medical director, University of Minnesota, University of Minnesota Hospitals, Minneapolis, Minn.

• **CHILD PSYCHIATRIST:** Joint appointment in department of pediatrics and psychiatry. Ample opportunities for research and teaching. Rank and salary depend upon qualifications. Staff and service of department will be expanded considerably in near future. Write to Dr. Reynold A. Jensen, office of the medical director, University of Minnesota, University of Minnesota Hospitals, Minneapolis, Minn.

• **RESEARCH DIRECTOR:** To develop an active research program for the Saratoga Spa at Saratoga Springs, N. Y. Ph.D. with experience in physiology. Knowledge of biochemistry also useful. Permanent New York State Civil Service position (G-27 with salary of \$6,562-7,992). Possible appointment to teaching staff of Albany Medical College. Write: Dr. Frank W. Reynolds, Medical Director.

• **PHARMACOLOGY:** The University of Alberta invites applications for the position of associate professor of pharmacology, in the department of physiology and pharmacology, effective September 1, 1954, at a salary within the range of \$5,250-6,250 per annum (not including cost-of-living bonus now approximately \$300), depending on qualifications. Duties include lecture and laboratory courses for medical and dental students and a program of research work. Applications should include a recent photograph or snapshot, a curriculum vitae, and three references. Address: Dean of Medicine, University of Alberta, Edmonton, Alberta, Can.

• **BACTERIOLOGY:** Applications are invited for position, department of bacteriology, Hebrew University-Hadassah Medical School, Jerusalem, Israel. Duties to commence October 1, 1954. Position vacancy in grade instructor, assistant or associate professor depending on qualifications. For further information write


Dr. Joseph Hirsch, Executive Secretary, Medical Advisory Board, 9 East 89th St., New York 28, N. Y.

• **OPHTHALMOLOGIST:** Full-time teaching and research faculty appointment. Excellent research and clinical facilities. Rank and salary depend upon qualifications. Address: V-19.

• **TEN TEACHING POSITIONS** are open at the University of Kabul Faculty of Medicine, Kabul, Afghanistan. They are internal medicine, external pathology (surgery), clinical surgery, neuropsychiatry, dermatology, otolaryngology, ophthalmology, radiology, pharmacology and histology. Candidates must be able to teach in either English, French or German. Salary range: \$7200 per year for assistant professor, lecturer (U.K.) Dozent (Germany), Agregé (France) or equivalent, \$9600 per year for associate professor, reader (U.K.) Ao professor (Germany) or equivalent, \$12,000 per year for professor or Ord professor (Germany) or equivalent.

Salaries are payable 70 per cent in dollars and 30 per cent in local currency at official rate of exchange. Contract period is three years, and may be extended by mutual agreement. Transportation is provided to and from Afghanistan for candidates selected but not for dependents. Teaching and clinical facilities exist in the Aliabad hospital, attached to the faculty as a university medical center. In addition to teaching duties, teachers will be assigned medical responsibilities in the university medical centers. Address: Dr. Mohammed Anas Khan, rector, University of Kabul, Kabul, Afghanistan.

• The Bowman Gray School of Medicine offers a one-year fellowship in PREVENTIVE MEDICINE. Opportunities for teaching in internal medicine and preventive medicine, for furthering training in internal medicine, and for individual research in one of several fields. Applicant should have at least two years of postgraduate training, one of which should be in internal medicine. Salary \$4500 married, \$4200 single. Address: V-20.



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To aid in solution of the problem of faculty vacancies, MEDICAL EDUCATION will list persons and positions available, as a free service. The school, department or person may have the option of being identified in these columns or of being assigned a key number for each position listed. Mail addressed to key numbers will be forwarded to the person or department listing the request.

Information for these columns should reach the Journal office, 185 N. Wabash Ave., Chicago 1, not later than the 10th of the month preceding publication.

• **CLINICAL ISOTOPE RESEARCH:** Internist or other qualified physician for career in research and teaching. Staff position with unusual opportunities to use isotope techniques. Clinical and laboratory facilities for independent and group research. University affiliation. Address: Dr. Marshall Brucer, Oak Ridge Institute of Nuclear Studies, P.O. Box 117, Oak Ridge, Tenn.

Personnel Available

• **BACTERIOLOGIST:** Ph.D., desires teaching and/or research position. Experience in teaching, research and consulting. Successful preparation of nurses, pharmacists and pre-medical students. At present, assistant professor. Available on short notice. Address: A-101.

• **INSTRUCTOR and/or RESEARCH ASSISTANT:** M.D. Japanese; American born. Age, 40. Reads, writes and speaks English fluently. Experience: 1 year residency in otorhinolaryngology; and 3 years residency in surgery at the Kyoto Prefectural Hosp. 3 years as medical lab technician at the U. S. Army Hosp. in Kyoto, Japan. 4 years as chief of E.E.N.T. department, Kushida Hosp., Osaka, Japan. Engaged in private practice since 1952. Address: A-102.

• **PHYSIOLOGIST:** M.D., associate professor, man, age 35, married. Swiss. Research for 7 years in respiration and circulation in Switzerland, U. S., England and Germany. 7 years teaching experience. Background in math, physics and chemistry. Prefers position in research or teaching for about 3 years. Publications and references. Available in autumn 1954. Address: A-103.

• **MICROBIOLOGIST:** Desires graduate research fellowship or assistantship permitting study toward Ph.D. degree. A.B., M.S. in bacteriology plus 2 years of graduate study toward Ph.D. completed. Research experience in therapy of parasitic infections and bacterial physiology. Numerous publications and member of Sigma Xi. Presently assistant professor of microbiology in small college. Available in July 1954. Address: A-104.

• **BIOCHEMIST-PHYSIOLOGIST:** Ph.D., age 27, 3 years teaching experience, research on cellular and blood thymo-nucleic acids, relationship to stress and tumor activity. Interested in working toward M.D. degree. Address: A-105.

• **ANATOMIST:** Ph.D., 33 years old. Has taught in recognized medical school. At present executive position in pharmaceutical in-

dustry. Wishes to return to academic profession. Has taught all fields of anatomy; interested in research. References: publications. Address: A-106.

• **PHARMACOLOGIST:** Male, age 33. Ph.D. Minors: biochemistry and physiology. 1 year graduate teaching and research assistant. Teaching and research position with medical, dental or pharmacy school pharmacology department desired. Available immediately. Address: A-107.

• **PHARMACOLOGIST:** M.D., Ph.D., married, 8 years teaching experience, active in research; publications. Desires position teaching with research or research only. Address: A-108.

• **INTERNIST:** Man. Age 42. M.D., Ph.D., F.A.C.P. More than 15 years experience in teaching, research and top-level administrative responsibility. Would like permanent position involving some teaching and/or clinical investigation. Address: A-109.

• **SURGEON:** 38, married, veteran. Diplomate of the American Board of Surgery. Training in general surgery with fellowship in tumor surgery. Background of research in biochemistry. Desires teaching position with opportunity for research; U. S. or foreign. Available July 1. Address: A-111.

• **ORTHOPEDIC SURGEON:** 36; certified; university trained; M.S. (orthopedic surgery) experience in traumatic surgery and rehabilitation of severely disabled. Seeks association with diplomate and university hospital affiliation. Address: A-112.

• **PHYSIOLOGIST—MICROBIOLOGIST:** Man, Ph.D., 30, veteran. 7 years experience in teaching physiology, microbiology and histology, medical school level. Member of scientific societies. Desires teaching fellowship with opportunity to work for M.D. in return for tuition and stipend. Prefer Canada or U. S. Goal—radiology. Available in fall. Address A-113.

• **PHARMACOLOGIST-PHYSIOLOGIST:** M.S., Zoology; Ph.D. expected June 1954. Experienced in pharmaceutical research, teaching experience in pharmacy during army service. Desires research and teaching position in physiology and pharmacology. Special interest in endocrinology. Member scientific societies, Sigma Xi. Publications; references. Address: A-114.

• **M.D., M.P.H.:** Diplomate of Board of Public Health and Preventive Medicine desires to head department of PUBLIC HEALTH and PREVENTIVE MEDICINE in medical school. 14 years varied experience in field combined with teaching at undergraduate and graduate levels. Capable of integrating this subject with rest of medical school curriculum. Address: A-115.

• **INTERNIST-CARDIOLOGIST:** M.D., 35, family. 7 years of university hospital training, including 4 years in cardiac laboratory. 30 publications. Certified in subspecialty. Now assistant professor of medicine. Seeking change of location. Prefers full-time permanent academic position. Address: A-116.

• **ANATOMIST:** 28, Ph.D. in anatomy. Desires teaching position at medical, dental or pharmacy school. Will consider teaching gross anatomy, histology, embryology or neuroanatomy. Chief interest is neuroanatomy. Continental U. S. school only. Available now. Address: A-122.

• **PHYSIOLOGIST-ENDOCRINOLOGIST:** Man, 31, Ph.D. 5 years experience in teaching and research at Harvard University. Seeking full-time academic position. Extensive experience in physiology, general endocrinology, endocrinology of reproduction, human heredity, research methodology, histology and zoological sciences. Will accept administrative duties and responsibilities. Salary secondary to good future. Address A-117.

• **HISTOLOGIST-HISTOCHEMIST:** Ph.D. Harvard; young man, teaching and research experience. Publications; member of scientific organizations. Interested in obtaining teaching or research position in eastern U. S. Address: A-118.

• **LABORATORY SUPERVISOR:** Administrative and/or teaching position in medical technology. 10 years supervisory experience. B.S. in bacteriology. Graduate credits in biochemistry, histology and pathology. Laboratory officer, Sanitary Corps, Medical Department, U. S. Army 4 years (captain). Publications; references. Seeks stimulating position, preferably with academic affiliation. Address: A-119.

• **SURGEON:** 32; American Board of Surgery certified. Married. Interested in academic career; category 4; prefer job with limited private practice privileges, but will consider any full-time position without private practice allowances. Address: A-120.

• **BACTERIOLOGIST:** Male, 30, M.Sc., married. 5 years teaching experience in medical bacteriology and general microbiology. 12 years practical and administrative experience in public health laboratories. Desires teaching position with research opportunities or administrative position in public health laboratory. Presently assistant professor of bacteriology. Available autumn 1954. Address: A-123.

• **BIOCHEMIST-RADIOCHEMIST:** Ph.D., 1952. Major in physical chemistry, minor in biochemistry. Experience in sterols, organic reaction mechanisms, small animal metabolism and radiocarbon dating. Presently engaged in research on mineral metabolism in man. Publications. Desires teaching or research position in applications of isotopes or physical chemistry to medical problems. Address: A-124.

• **INTERNIST:** M.D., practicing physician, consultant in medicine and endocrinology, interested in university position developing research study to determine the potential of measuring taste as it adapts to and reflects immediate physiologic and nutritional needs. Hospital and medical school teaching experience. Certified Am. Bd. of Internal Medicine; Am. Coll. Physicians. Address: A-125.

• **BIOCHEMIST:** Biochemistry-Internal medicine Ph.D., M.D., 40. Interested in medical school appointment for teaching and research. Experience in teaching, research and private practice. Particularly interested in clinical correlation of basic sciences. Address: A-126.

• **PHYSIOLOGIST:** Ph.D., male, 37, family. Experience in research and teaching mammalian physiology. Research emphasis in neurophysiology and visual physiology. Experienced in using electrophysiological techniques. Acquainted with problems and techniques of electromyography, especially as applied to human studies. Publications. References. Desires opportunity for research with or without teaching responsibilities. Available. Address: A-127.

• **PHYSIOLOGIST:** Ph.D., 35, married. Presently associate professor of medical physiology in large medical school. Fifteen years experience in teaching and research, the last seven in medical schools. Many publications in fields of nutrition, respiration, endocrinology, steroids, radioisotopes. Experienced in organization, administration, teaching. Considerable clinical experience. Will consider any location. Salary above \$7000. Address: A-129.

• **PHYSIOLOGIST:** M.D., Ph.D., 35, family. Training requirements for boards in internal medicine completed. Teaching and research experience. Army service will be terminated end of 1954. Desires full-time academic position where basic science and clinical interests in teaching and research may be fulfilled. Address: A-128.

• **PHYSIOLOGIST:** Ph.D., 38, broad biological training. Wide experience in teaching and research. Desires teaching position in Chicago area with opportunity for research. Available September 1. Interest and experience in connective tissue permeability and biological effects of x-rays. Married. Address: A-130.

• **PHYSICAL CHEMIST-BIOCHEMIST:** Woman, single, 30, Ph.D., 1949. Major in physical chemistry, minor in biochemistry. Two years experience in clinical research on total body water and kinetics of water transfer. Desires teaching with some research. Publications, references. Address: A-131.

• **ANATOMIST:** 30, married, Ph.D. Specialty is neuroanatomy. Competent in human gross anatomy and histology. Two years completed in medical school. At present associate professor in medical school. Nine years teaching experience in medical school. Have had full charge of course in medical neuroanatomy. Research primarily in neurocytology and gross anatomy. Major advisor on graduate work was very eminent neuroanatomist. Minor work was in neuropathology. Prefer to remain in teaching and research in a medical school. Address: A-132.

• **INTERNIST-GASTROENTEROLOGIST:** M.D. Mayo and university training, total over five years, including gastroscopy and proctoscopy. Also interested in hematology and peripheral vascular diseases. Certified by American Board of Internal Medicine. Now instructor, department medicine. Family. Desires change in location. Address: A-133.

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